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DEPARTMENT OF FISH AND GAME

Jerry M. Conley, Director

FEDERAL AID IN FISH RESTORATION
Job Performance Report
Program F-71-R-18

REGIONAL FISHERIES MANAGEMENT INVESTIGATIONS

SALMON REGION (Subprojects I-H, II-H, N-H)

PROJECT I.	**SURVEYS AND INVENTORIES**
Job a.	**Salmon Region Mountain Lakes Investigations**
Job b.	**Salmon Region Lakes and Reservoirs Investigations**
Job c'.	**Salmon Region Rivers and Streams Investigations-Salmon and Middle Fork Salmon Rivers Snorkeling Transects**
Job c^2.	**Salmon Region Rivers and Streams Investigations-Salmon and North Fork Salmon Rivers Drainage Fishery Surveys**
Job d.	**Salmon and Steelhead Investigations**
PROJECT II.	TECHNICAL **GUIDANCE**
PROJECT IV.	**POPULATION MANAGEMENT**

By

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July 1996
IDFG 96-14

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1993 ANNUAL PERFORMANCE REPORT

State of: Idaho Program: Fisheries Management F-71-R-18

Project I: Surveys and Inventories Subproject I-H: Salmon Region

Job: a Title: Mountain Lakes Investigations

Contract Period: July 1, 1993 to June 30, 1994

ABSTRACT

Volunteers conducted surveys on two alpine lakes in the White Cloud Peaks. Survey information included fish species and size composition, spawning habitat, access, fish condition and angler use.

Authors:

Mark Liter
Regional Fishery Biologist

James Lukens
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OBJECTIVE

1. To collect data on species composition, access, trail conditions, angler/camper use, and spawning habitat for selected Salmon Region mountain lakes.

METHODS

Volunteers were utilized to survey Salmon Region mountain lakes in 1993. Volunteers were supplied with survey forms, maps, metric rules, and instructions to complete forms. These anglers collected data on species and size composition, catch rates, trail access and condition, relative angler/camper use, and availability of spawning habitat.

Volunteers conducted surveys on two alpine lakes in the White Cloud Peaks. Survey information included fish species and size composition, spawning habitat, angler use, and to access fish condition (Appendices A and B).

Volunteers conducted surveys on two alpine lakes in the White Cloud Peaks (Appendices A and B). Anglers fished 21 hours and caught 118 fish for an overall catch rate of 5.6 fish per hour.

LAKE LOCATION

Lake name: Casino Lake #1 Survey date: Aug. 5-6, 1993
IDFG catalog no.: 07-1519 Primary drainage: Big Casino Creek
Secondary drainage: Salmon River County: Custer
USFS ranger district: Sawtooth NRA Wilderness area: N/A
Section: 21 Township: 10 Range: 14 Elevation(ft): 9000

USE

No. campsites: 3 No. firepits: 3 Litter: l X m ____ h ____
Trail around lake: complete ____ partial X trampled X yes ____ no
Access: good trail(mi) 6 poor trail(mi) 0.2 cross country(mi) 0
Trailhead location: Big Casino Creek Campground

FISHERY AND FISH POPULATIONS

Creel Survey

No. fishermen: 2 Hours fished: 5.5 No. fish caught: 98
Fish/hour: 8.9 Fish abundance: l ____ m ____ h X

Length Frequency

Total Length (mm)

Species	0-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	>400
Brook Tr.				49	49				
TOTAL									

Stocking History

Year	Species	Number of fish	Comments
1957	CT	2,400	Mackay

COMMENTS

One main outlet. Shore trampled near main camp area but in good shape. Numerious fry in inlet and outlet. Surface feeding visible. Main campsite with fire ring, horse tying area and level tent site. Pristine, beautiful area with great brook trout fishing.

Appendix B.

LAKE LOCATION

Lake name: Casino Lake #2 Survey date: Aug. 6, 1993
IDFG catalog no.: 07-1520 Primary drainage: Big Casino Creek
Secondary drainage: Salmon River County: Custer
USFS ranger district: Sawtooth NRA Wilderness area: N/A
Section: 28 Township: 10 Range: 14 Elevation(ft): 9000

USE

No. campsites: 0 No. firepits: 0 Litter: l X m _____ h _____
Trail around lake: complete _____ partial X trampled _____ yes X no
Access: good trail(mi) 6 poor trail(mi) 0.2 cross country(mi) 0
Trailhead location: Big Casino Creek Campground

FISHERY AND FISH POPULATIONS

Creel Survey

No. fishermen: 2 Hours fished: 5 No. fish caught: 20
Fish/hour: 2.0 Fish abundance: l X m X h _____

Length Frequency

Total Length (mm)

Species	0-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	>400
Cutthroat Tr.								5	15
TOTAL									

Stocking History

Year	Species	Number of fish	Comments
1937	CT	4,000	Hayspur
1990	C2	500	Mackay

COMMENTS

Fish were beautiful, small heads with large bodies, deep and thick. Shore in good shape, not trampled. Surface feeding observed. Two inlets, one outlet.

1993 ANNUAL PERFORMANCE REPORT

State of: Idaho Program: Fisheries Management F-71-R-18

Project I: Surveys and Inventories Subproject I-H: Salmon Region

Job: b Title: Lakes and Reservoirs Investigations

Contract Period: July 1, 1993 to June 30, 1994

ABSTRACT

Gill nets were used to obtain scale samples for age and growth analyses of the fish community of Williams Lake in June 1993. Rainbow trout *Oncorhynchus mykiss* was the only species captured in Williams Lake, although an intensive survey conducted by Department personnel in 1992 showed rainbow trout and bull trout *Salvelinus confluentus* were found in the lake, with rainbow trout comprising > 90% of the fish population.

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INTRODUCTION

Williams Lake, a culturally eutrophied lake, is located in north central Lemhi County at 1,600 m elevation. The surface area is 73 hectares, maximum depth is 56 m, and mean depth is 23 m. The main source of inflow is Lake Creek, with some inflow from springs and intermittent streams. Rainbow trout *Oncorhynchus mykiss* and bull trout *Salvelinus confluentus* are the only fish species in the lake.

Water quality degradation, caused by nutrient input from eroded sediments and leaching of septic systems, may be responsible for the reduction in number and size of fish harvested from Williams Lake (Davis and Reingold 1988). Low winter and summer oxygen concentrations probably limit fish survival. In 1992, the Idaho Department of Health and Welfare Division of Environmental Quality (DEQ) selected the consulting firm of Kramer, Chin and Mayo, Inc. to conduct limnological and water quality monitoring and provide restoration alternatives.

METHODS

Gill nets were used to sample fish in Williams Lake during June 1993. Experimental floating and sinking monofilament nets, 150 ft x 6 ft with six panels ranging from 3/4-in to 2 1/2-in bar mesh, were fished. Each net was set perpendicular to shore with the smallest mesh towards shore. Scale samples and total lengths (mm) were used to make age and growth determinations. Acetate impressions were made using 65°C heat and 4,000 PSI pressure and projected using a Ken-a-vision projector on a Houston Instruments Hipad digitizer tablet.

The location of each annulus was marked with the digitizer's cursor, which entered the measurements of each scale directly into the computer via the fish growth program DISBCAL (Frie 1982). Mean fish length at age was also calculated by DISBCAL.

RESULTS

A total of 46 rainbow trout were used for age and growth estimates in 1993. Rainbow trout ranged from 165 mm to 440 mm with a mean length of 329 mm. Few fish > 400 mm were captured. Back-calculated lengths for age groups 1, 2, 3, and 4 were 133 mm, 254 mm, 351 mm, and 401 mm, respectively (Table 1).

The largest growth increment was for age 1 rainbow trout. The mean back-calculated length at age for Williams Lake rainbow trout at age 1 was 133 mm. At age 3, growth of rainbow trout in Williams Lake seems to slow, and no fish greater than age 4 were collected.

Table 1. Average back-calculated lengths for each age class in Williams Lake, June 1993.

Year class	Age	N	Back-calculated age 1	2	3	4
1992	1	7	225			
1991	2	10	180	278		
1990	3	18	102	256	354	
1989	4	11	82	230	347	401
All Classes			132.8	254.3	351.1	401.4
N		46				

Weights ranged from 50 g to 805 g from 45 rainbow trout. Weight increased geometrically as a function of length with the largest weight increments from 400 to 450 mm.

RECOMMENDATIONS

Fishing pressure, total harvest, and catch rates have declined steadily over the past 15 years (Davis and Reingold 1988). This may be the result of water quality degradation in Williams Lake due to nutrient input from eroded sediment and leaching of septic systems. Artificial aeration is the recommended management option to provide more usable fish habitat during periods of low oxygen concentration.

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1993 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-18

Project I: Surveys and Inventories

Subproject I-H: Salmon Region

Job: c[1] Salmon and Middle Fork Salmon Rivers Snorkeling Transects

Title: Rivers and Streams Investigations

Contract Period: July 1, 1993 to June 30, 1994

ABSTRACT

Mean densities of age 1 and older cutthroat trout *Oncorhynchus clarki,* juvenile rainbow/steelhead trout *O. mykiss,* and juvenile chinook salmon *O. tshawytscha* counted in Middle Fork Salmon River transects in 1993 were 0.5, 0.07, and 0.006 fish/100 m2, respectively. In Middle Fork Salmon River tributary transects, cutthroat trout densities averaged 0.8/100 m2, rainbow/steelhead averaged 0.82/100 m^2, and chinook averaged 0.007/100 m^2.

In Salmon River canyon tributaries (Horse, Bargamin, and Chamberlain creeks), fish densities were 5.4 rainbow/steelhead/100 m2, 0.2 cutthroat/ 100 m2, and 0.07 chinook salmon/ 100 m2.

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INTRODUCTION

The Middle Fork Salmon River (MFSR), part of the Wild and Scenic Rivers System, flows through a remote area in east central Idaho. All of the mainstem is within the Frank Church River of No Return Wilderness Area. The Middle Fork originates at the confluence of Bear Valley and Marsh creeks near Cape Horn Mountain. The river flows 171 km to its confluence with the main Salmon River 92 km downstream from Salmon, Idaho (Figure 1).

Road access exists to Dagger Falls and the Salmon River confluence. Headswaters of some tributaries are accessible via primitive roads. The lower 156 km of the Middle Fork is accessible only by aircraft, float boats, or horse/foot trails. The MFSR is a major recreational river that offers a wide variety of outdoor and backcountry opportunities. The number of people floating the river has increased from 625 in 1962 to 10,234 in 1993 (U.S. Forest Service data).

The earliest MFSR fishery study conducted in 1959 and 1960 evaluated westslope cutthroat trout *Oncorhynchus clarki lewisi* life history and seasonal movements (Mallet 1963). In 1971, additional studies were initiated to monitor MFSR cutthroat trout abundance and to evaluate catch-and-release regulations which were established in 1972. Similar regulations were adopted for major tributaries in the early and mid-1980s.

Part of the studies initiated in 1971 included establishment of snorkeling transects which were surveyed periodically (Corley 1972; Jeppson and Ball 1977, 1979). Since 1971, several additional studies have been initiated within the Middle Fork and its tributaries. In 1981, a project was initiated on the Middle Fork to evaluate wild steelhead trout *O. mykiss* (Thurow 1982, 1983, 1985). In 1985, another study was initiated to determine juvenile steelhead, chinook salmon *O. tshawytscha*, and cutthroat trout densities in the Middle Fork and its tributaries (Reingold and Davis 1987a, 1987b, 1988; Lukens and Davis 1989; Davis et al. 1992; Schrader and Lukens 1992; Liter and Lukens 1992).

This report, a continuation of the 1985 study, presents data collected in July 1993 pertaining to fish densities in the MFSR drainage and three Salmon River tributaries.

OBJECTIVES

1. To monitor juvenile steelhead trout and chinook salmon densities within the Middle Fork, its tributaries, and Salmon River tributaries.

2. To monitor the effects of catch-and-release regulations on resident fish populations in the MFSR drainage, particularly cutthroat trout.

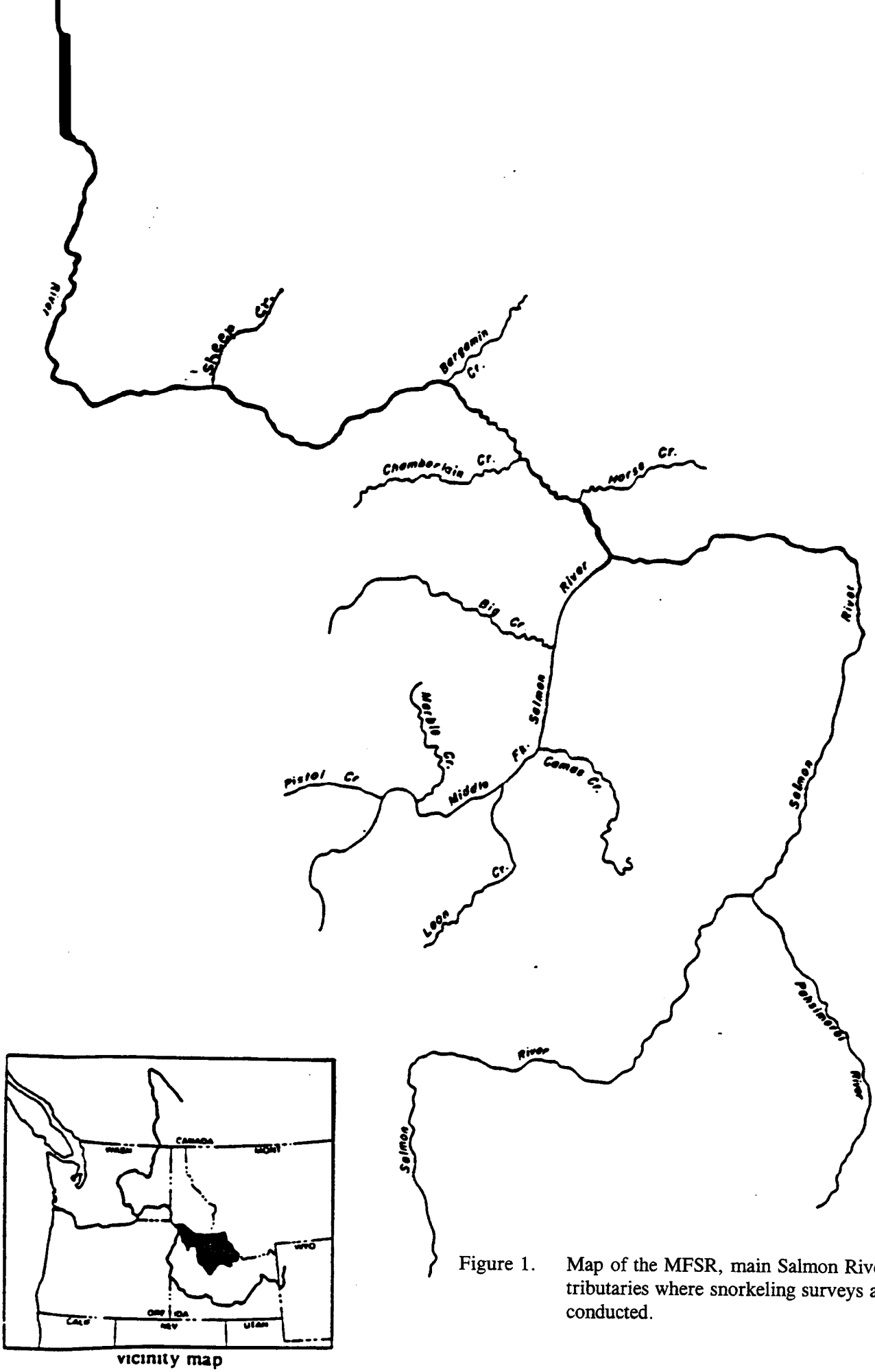

Figure 1. Map of the MFSR, main Salmon River and tributaries where snorkeling surveys are conducted.

METHODS

In 1993, 25 of 29 MFSR transects (Table 1), 6 of 7 MFSR tributary transects (Table 2), and 6 Salmon River tributary transects (Table 3) were surveyed via snorkeling. Five new MFSR tributary transects were established and four of these sites were counted (Table 2). Two new sites were established on Indian Creek, one on Marble Creek, one on Camas Creek, and one on Big Creek. The MFSR tributary transects on Upper Big Creek and Lower Big Creek were not snorkeled because of excessive turbidity. The MFSR and MFSR tributary transects were snorkeled July 19 to 27, the Salmon River tributary transects July 26 to 27.

The techniques used to survey these transects are described by Reingold and Davis (1987a, 1987b) and Scully et al. (1990).

Project angling was conducted throughout the mainstem MFSR utilizing conventional fly fishing gear to further evaluate fish species and length composition.

All data was compared to previous information to identify trends.

RESULTS

Middle Fork Salmon River Snorkeling Transects

The total number of cutthroat trout, juvenile rainbow/steelhead, and juvenile chinook salmon counted in MFSR transects were 156, 29, and 1, respectively (Table 4). Mean densities were 0.5, 0.07, and 0.006 fish/100 m^2 for cutthroat trout, rainbow/steelhead, and chinook salmon, respectively (Table 5).

Middle Fork Salmon River Tributary Snorkeling Transects

Juvenile rainbow/steelhead densities ranged from 0 to 2.02 fish/100 m^2 and averaged 0.82 (Table 6). Mean juvenile chinook density was 0.007 fish/100 m^2 and ranged from 0 to 0.07. Cutthroat trout densities averaged 0.8 fish/100 m^2 and ranged from 0 to 2.03.

Table 1. Locations and dimensions of MFSR snorkeling transects, July 1993.

Fish type[a]	Location (river km)[b]	Transect name	Length (m)	Visibility (m)	Visible corridor (m)	Area (m^2)	Passes
Sh	0.3	Boundary	54	7.6	15.2	821	1
Ct/Ck	4.3	Gardell's Hole	80	3.9	15.6	1,248	2
Ct/Ck	8.8	Velvet	--	--	--	--	--
Sh	13.6	Elkhorn	--	--	--	--	--
Sh	21.3	Sheepeater	95	4.7	18.8	1,786	2
Ct/Ck	24.5	Greyhound	--	--	--	--	--
Sh	29.6	Rapid River	185	4.2	8.4	1,554	1
Sh	40.0	Indian	190	3.8	7.6	1,444	1
Ct/Ck	44.3	Pungo	66	5.4	10.8	713	1
Ct/Ck	51.0	Marble Pool	170	5.4	10.8	1,836	1
Sh	52.3	Ski jump	85	4.7	9.4	799	1
Ct/Ck	60.6	Lower Jackass	257	5.2	10.4	2,673	1
Sh	64.6	Cougar	115	5.6	11.2	1,288	1
Ct/Ck	73.9	Whitey Cox	124	3.8	7.6	942	1
Sh	74.1	Rock Island	90	3.8	7.6	684	1
Ct/Ck	82.9	Hospital Pool	128	5.3	10.6	1,357	1
Sh	84.3	Hospital Run	150	5.3	10.6	1,590	1
Ct/Ck	92.6	Tappan Pool	115	4.2	16.8	1,932	2
Sh	92.8	Lower Tappan Run	142	3.6	7.2	1,022	1
Ct/Ck	106.6	Flying B	85	4.2	8.4	714	1
Sh	108.6	Airstrip	93	5.4	10.8	1,004	1
Sh	119.7	Survey	137	3.0	12.0	1,644	2
Ct/Ck	124.6	Big Creek Bridge	98	3.2	12.8	1,254	2
Sh	127.8	Love Bar	93	3.2	12.8	1,190	2
Ct/Ck	135.8	Ship Island	125	3.6	7.2	900	1
Sh	144.0	Little Ouzel	--	--	--	--	--
Ct/Ck	144.6	Otter Bar	215	2.5	5.0	1,075	1
Ct/Ck	151.5	Goat Creek Pool	95	3.1	6.2	589	1
Sh	151.8	Goat Creek Run	80	2.9	5.8	464	1

[a] Sh-steelhead, Ct-cutthroat, Ck-chinook salmon.
[b] River km starts at Dagger Falls.

Table 2. MFSR tributary transects, July 1993.

Transect name	Length (m)	Area (m^2)	Location
Pistol Creek #1 (lower)	97.0	1,533	At mile marker 16
Pistol Creek #2 (upper)	87.3	1,283	Above mile marker 16
Indian Creek #1 (lower)*	80.0	994	--
Indian Creek #2 (upper)*	77.0	855	--
Marble Creek #1 (lower)	57.5	880	Above pack bridge
Marble Creek #2 (upper)*	106.0	1,251	
Loon Creek #1 (lower)	60.0	960	Below pack bridge
Loon Creek #2 (upper)	36.0	612	400 yards above pack bridge
Camas Creek #1 (lower)	72.0	1,469	From pack bridge downstream
Camas Creek #2 (upper)*	54.0	972	
Big Creek #1 (lower)	--	--	400 yards above mouth
Big Creek #2 (upper)*	--	--	--

* = newly established transects

Table 3. Main Salmon River tributary transects, July 1993.

Transect name	Length (m)	Area (m^2)	Location
Horse Creek #1 (bridge)	41.9	454.1	50 yards above bridge
Horse Creek #2 (upper)	48.7	714.5	150 yards above bridge
Chamberlain #1 (mouth)	41.3	603.0	400 yards above mouth
Chamberlain #2 (run)	30.9	434.8	500 yards above mouth
Bargamin Creek #1 (lower)	43.1	631.8	440 yards above mouth
Bargamin Creek #2 (upper)	30.8	529.8	At trail flat above #1

Table 4. Total number of cutthroat trout, rainbow/steelhead and chinook salmon, by length group (mm), and other fish species counted in MFSR transects, July 1993.

Transect	Cutthroat						Rainbow/steelhead			Chinook		Bull trout	White-fish	Other[$]	Total fish	Area
	<75	75-150	150-230	230-300	>300		75-150	150-230	230-300	>300		Age 0	Agel					
Boundary	0	0	0	0	0	0	0	0	1	0	0	0	3	0	4	821
Gardell's Hole	0	0	2	3	1	0	0	0	0	0	0	0	7	6	19	1,248
Velvet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Elkhorn	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sheepeater	0	0	3	0	0	1	0	0	0	0	0	0	21	0	25	1,786
Greyhound	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rapid River	0	0	4	4	2	1	13	0	0	0	0	0	13	0	37	1,554
Indian	0	0	0	7	3	1	1	0	0	0	0	0	8	0	20	1,444
Pungo	0	0	2	1	0	1	0	0	0	0	0	0	3	0	7	713
Marble Pool	0	4	6	6	7	1	0	0	0	0	0	0	19	0	43	1,836
Ski-jump	0	4	7	2	2	0	0	0	0	0	0	0	4	0	19	799
Lower Jackass	0	0	4	15	3	0	2	0	0	0	0	0	32	56	112	2,673
Cougar	0	0	0	0	0	1	0	0	0	0	0	0	1	0	2	1,288
Whitey Cox	0	0	0	1	0	0	0	0	0	0	0	0	3	6	10	942
Rock Island	0	0	1	1	1	0	0	0	0	0	0	0	5	2	10	684
Hospital Pool	0	0	0	2	2	0	1	0	0	0	0	0	8	0	13	1,357
Hospital Run	0	0	0	2	3	0	1	0	0	0	0	0	24	0	30	1,590
Tappan Pool	0	0	0	0	3	0	0	0	0	0	0	0	5	4	12	1,932
L. Tappan Run	0	0	0	1	1	0	0	0	0	0	0	0	5	3	10	1,022
Flying B	0	0	0	6	1	0	0	0	0	1	0	0	18	2	28	714
Airstrip	0	0	1	3	0	0	1	0	0	0	0	0	4	3	12	1,004
Survey	0	0	1	7	3	0	0	0	0	0	0	1	11	52	75	1,644
Big Creek Bridge	0	0	0	18	4	0	0	1	0	0	0	0	14	67	104	1,254
Love Bar	0	0	0	0	0	0	0	0	0	0	0	0	2	9	11	1,190
Ship Island	0	0	0	0	0	1	0	0	0	0	0	0	1	31	33	900
Little Ouzel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Otter Bar	0	0	0	1	0	0	1	0	0	0	0	0	0	59	61	1,075
Goat Cr. Pool	0	0	0	0	1	0	0	0	0	0	0	0	0	45	46	589
Goat Cr. Run	0	0	0	1	0	0	0	0	0	0	0	0	2	15	18	464
Column total	0	8	31	81	37	7	20	1	1	1	0	1	213	360	761	
Grand total			156				29				1	1				

'Suckers, squawfish and shiners.

Table 5. Densities of cutthroat trout, rainbow/steelhead and chinook salmon (fish/ 100 m^2) in MFSR transect, July 1993.

Transect	Cutthroat	Rainbow/ steelhead	Chinook	Total fish[y]
Boundary	0	0.12	0	0.5
Gardell's Hole	0.48	0	0	1.5
Velvet	--	--	--	--
Sheepeater	--	--	--	--
Sheepeater	0.17		0.06	0
Greyhound	--	--	--	--
Rapid River	0.64	0.84	0	2.4
Indian	0.69	0.14	0	1.4
Pungo	0.42	0	0	1.0
Marble Pool	1.25	0.05	0	2.3
Ski jump	1.88	0	0	2.4
Lower Jackass	0.82	0.07	0	4.2
Cougar	0	0.08	0	0.2
Whitey Cox	0.11	0	0	1.1
Rock Island	0.44	0	0	1.5
Hospital Pool	0.29	0.07	0	1.0
Hospital Run	0.31	0.06	0	1.9
Tappan Pool	0.16	0	0	0.6
L. Tappan Run	0.20	0	0	1.0
Flying B	0.98	0	0.14	3.9
Airstrip	0.40	0.01	0	1.2
Survey	0.67	0	0	4.6
Big Creek Bridge	1.75	0.08	0	8.3
Love Bar	0	0	0	0.9
Ship Island	0	0.11	0	3.7
Little Ouzel	--	--	--	--
Otter Bar	0.09	0.09	0	5.7
Goat Creek Pool	0.17	0	0	7.8
Goat Creek Run	0.22	0	0	3.9
Average	0.5	0.07	0.006	2.6
Weighted mean	0.5	0.09	0.003	2.5

[a] Total fish also includes suckers, squawfish, shiners, whitefish, and bull trout.

Table 6. Number of rainbow/steelhead and cutthroat trout by length group (mm), juvenile chinook salmon and miscellaneous species (Wf = whitefish, Bt = bull trout) counted in MFSR tributary transects, July 1993.

Location	Area (m^2)	Rainbow/steelhead					Cutthroat								
		<75	75-150	150-230	230-300	Rb/100 m^2	75-150	150-230	230-300	>300	Ct/100 m^2	Age 0	Ck/100 m^2	Wf	Bt
Pistol Cr. #1 (lower)	1,533	0	18	11	2	2.02	10	4	1	0	0.98	0	0	7	4
Pistol Cr. #2 (upper)	1,283	0	11	11	1	1.79	4	6	10	6	2.03	0	0	15	0
Indian Cr. #1 (lower)	944	0	1	2	0	0.32	0	0	1	1	0.21	0	0	3	0
Indian Cr. #2 (upper)	855	0	0	0	0	0	2	3	2	0	0.70	0	0	5	0
Marble Cr. #1 (lower)	880	0	8	1	0	1.02	0	0	0	0	0.00	0	0	8	0
Marble Cr. #2 (upper)	1,251	0	8	0	2	0.80	1	0	0	0	0.80	0	0	11	0
Loon Cr. #1 (lower)	960	1	0	5	1	0.73	0	3	5	3	1.25	0	0	23	0
Loon Cr. #2 (upper)	612	0	3	3	0	0.98	0	0	2	0	0.82	0	0	10	0
Camas Cr. #1 (lower)	1,469	0	2	1	0	0.20	0	3	5	4	0.82	1	0.07	39	0
Camas Cr. #2 (upper)	972	0	2	1	2	0.31	0	3	5	2	1.03	0	0	16	0
Big Cr. #1 (lower)															
Big Cr. #2 (upper)															
Mean						0.82					0.80		0.007		
Weighted Mean						0.88					0.80		0.009		

Salmon River Tributary Transects

The rainbow/steelhead observed in Horse, Chamberlain, and Bargamin creeks were predominantly juvenile steelhead. These tributaries may provide spawning and rearing habitat for the only significant population of wild upper Salmon River "A" strain steelhead. Rainbow/steelhead densities ranged from 4.3 to 7.0 fish/100 m^2 and averaged 5.4 (Table 7).

Chinook densities were low and ranged from 0 to 0.2 fish/100 m^2. Cutthroat trout densities ranged from 0 to 0.4 fish/100 m^2.

Project Angling

Idaho Department of Fish and Game project anglers caught 314 fish which were comprised of rainbow/steelhead (21%), cutthroat trout (77%), and rainbow/cutthroat hybrids (2%) (Figure 2). The cutthroat trout averaged 285.2 mm, rainbow/steelhead 184.5 mm, and hybrids 333.1 mm (Figure 2).

DISCUSSION

Middle Fork Salmon River Snorkeling Transects

A downward trend in juvenile steelhead densities, which started in 1986, leveled off in 1993 (Figure 3).

For the second time since 1985, no chinook were observed in traditional MFSR transects (Figure 4). This is the third consecutive year chinook densities have been at 0 in chinook transects.

The density of cutthroat trout, counted in cutthroat/chinook transects, increased from 1992 to 1993, while densities for all transects combined decreased slightly (Figure 5). The density of cutthroat trout larger than 300 mm has remained fairly stable since 1985 (Figure 5).

In 1971 when snorkeling transects were first established specifically for cutthroat trout, observed numbers were low (Figure 6). Following establishment of catch-and-release regulations for the mainstem MFSR in 1972, cutthroat trout numbers increased and appeared to peak in the early to mid-1980s. The trend the last four years has been a general decline with very low numbers observed. While fishing pressure and resulting hooking mortality in the MFSR probably are not limiting cutthroat abundance (Liter and Lukens 1992), other factors may

Table 7. Number of rainbow/steelhead and cutthroat trout, by length group (mm), juvenile chinook salmon and miscellaneous species (Bt=bull trout, Wf = whitefish) counted in Salmon River tributary transects, July 1993.

Location	Area (m^2)	Rainbow/steelhead						Cutthroat					Chinook				
		<75	75-150	150-230	230-300	> 300	Rb/100 m^2	75-150	150-230	230-300	> 300	Ct/100 m^2	Age 0	Age 1	Ck/100 m^2	Bt	Wf
Horse Cr. #1 (bridge)	454.1	0	16	13	3	0	7.0	0	0	0	0	0	2	0	0	0	5
Horse Cr. #2 -upper	714.5	0	17	23	2	1	6.0	0	0	0	3	.4	0	0	0	1	10
Chamberlain Cr. #1 (mouth)	603.0	2	5	17	1	1	4.3	0	0	1	0	.2	1	0	0.2	0	2
Chamberlain Cr. #2 (run)	434.8	2	2	13	1	1	4.4	0	0	0	1	.2	0	0	0	0	8
Bargamin Cr. #1 lower	631.8	0	19	12	1	0	5.1	0	0	1	1	.3	0	0	0	0	0
Bargamin Cr. #2 upper	529.8	0	14	15	0	0	5.5	0	0	0	1	.2	1	0	0.2	0	2
Sheep Cr. #1 -lower																	
Sheep Cr. #2 -upper																	
Mean							5.4					0.2			0.07		
Weighted mean							5.4					0.2			0.12		

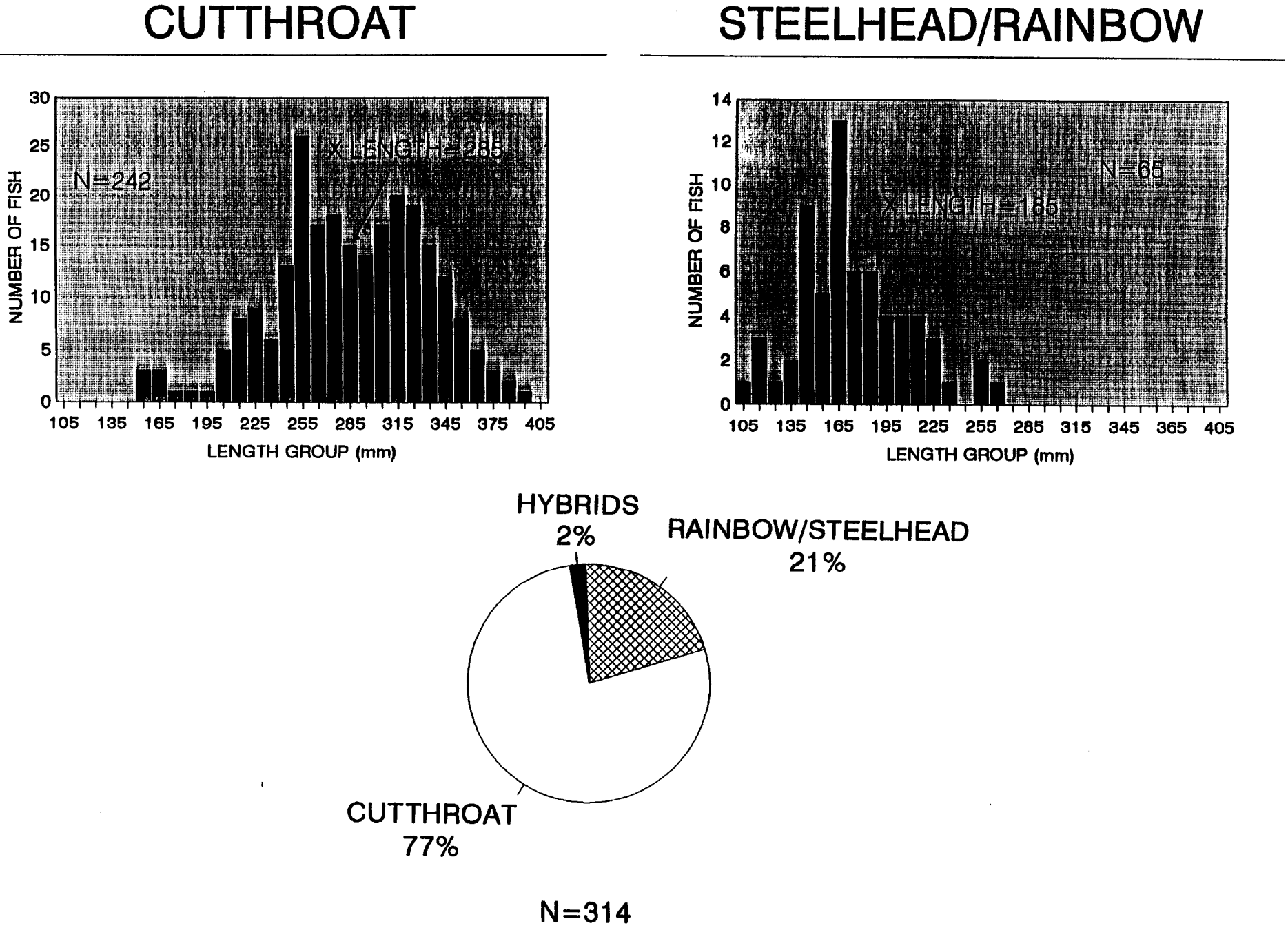

Figure 2. Species composition of fish caught by Department project anglers and length frequency of cutthroat trout and rainbow/steelhead, July 1993.

MFSR STEELHEAD DENSITIES

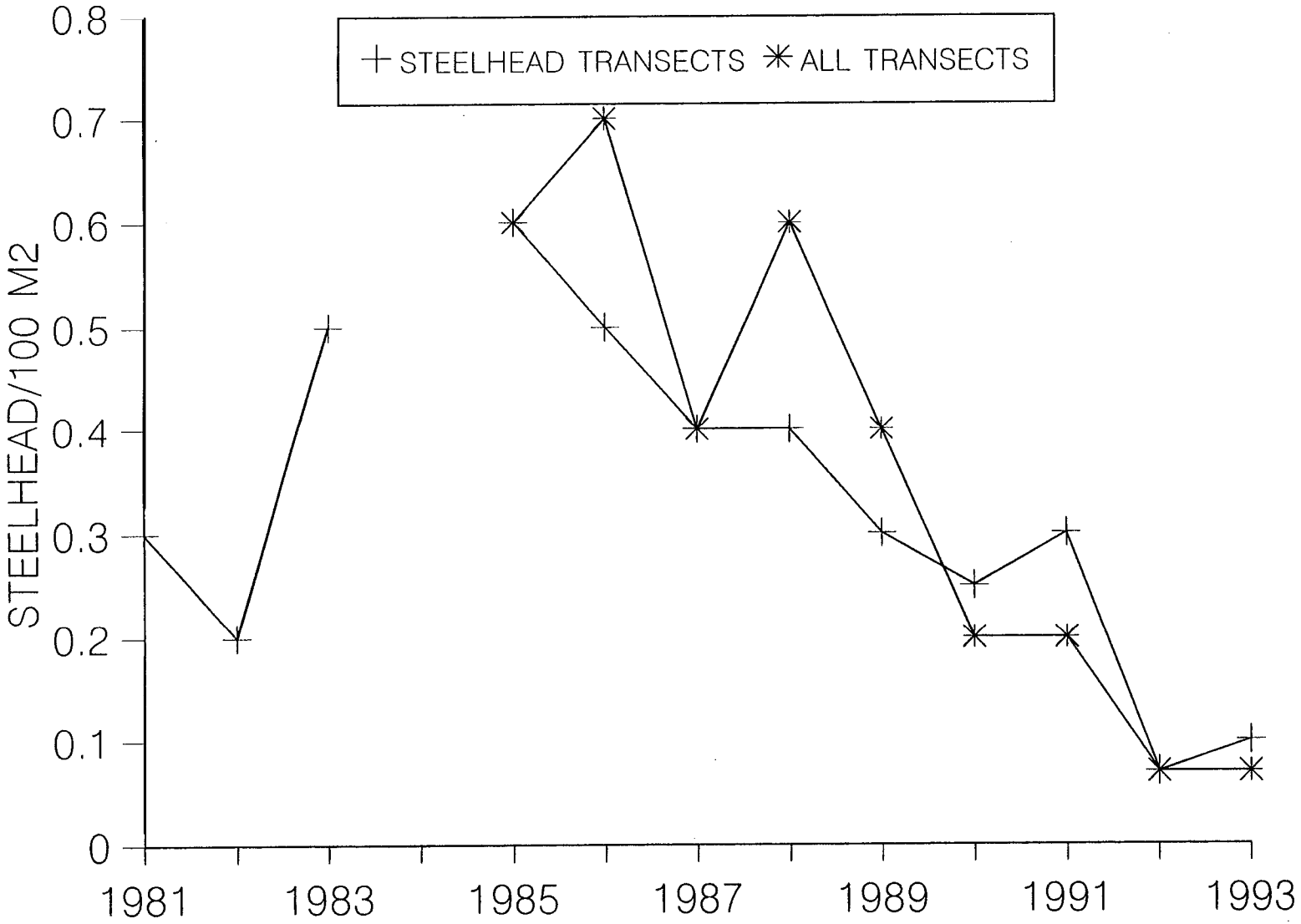

Figure 3. Densities of juvenile steelhead counted in all MFSR snorkeling transects and in steelhead only transects (see Table 1), 1981-1993. Data for 1981-83 from Thurow (1982, 1983, 1985).

MFSR CHINOOK DENSITIES

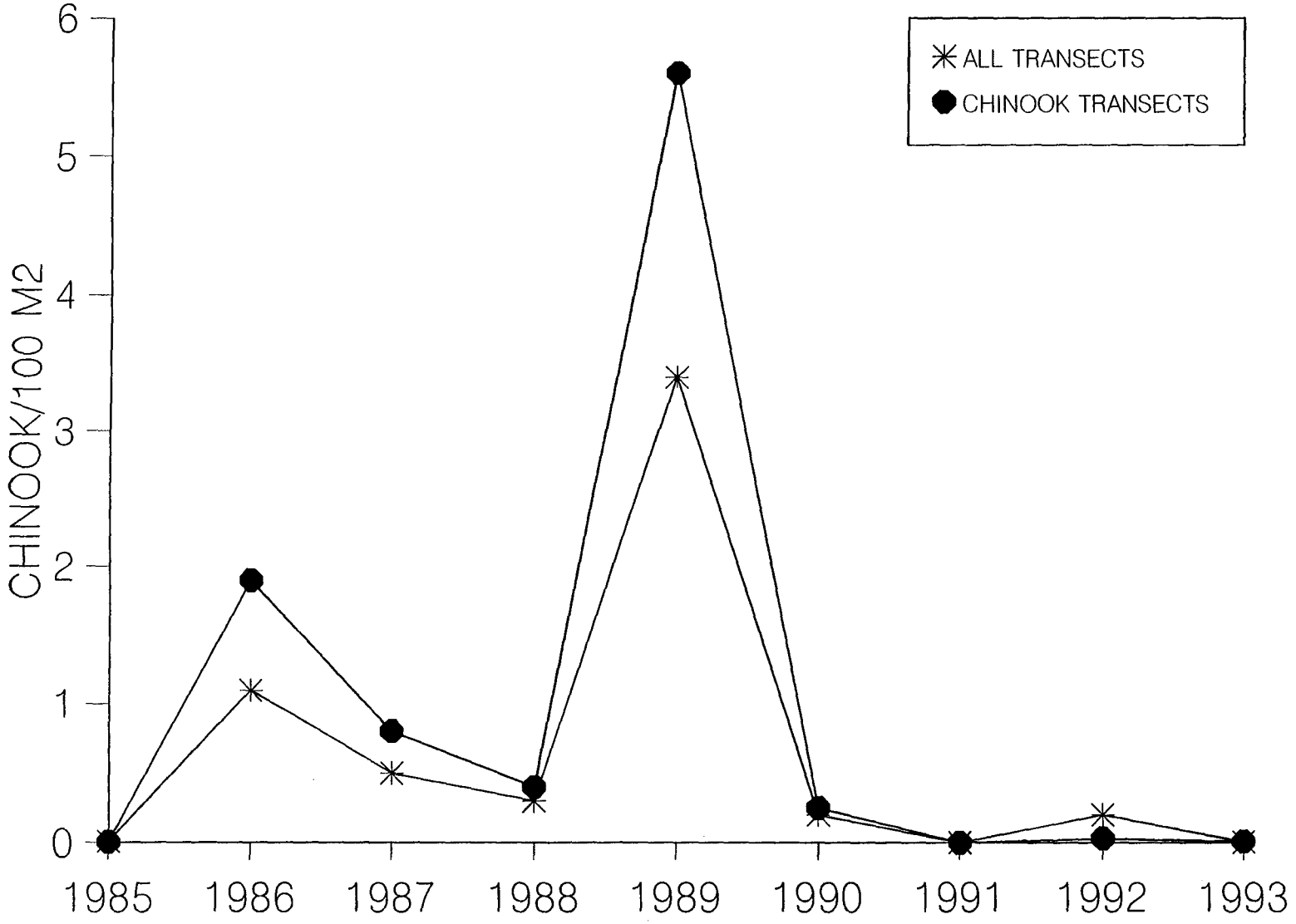

Figure 4. Densities of chinook salmon counted in all MFSR transects and in chinook/cutthroat only transects (see Table 1), 1985-93.

MFSR CUTTHROAT DENSITIES

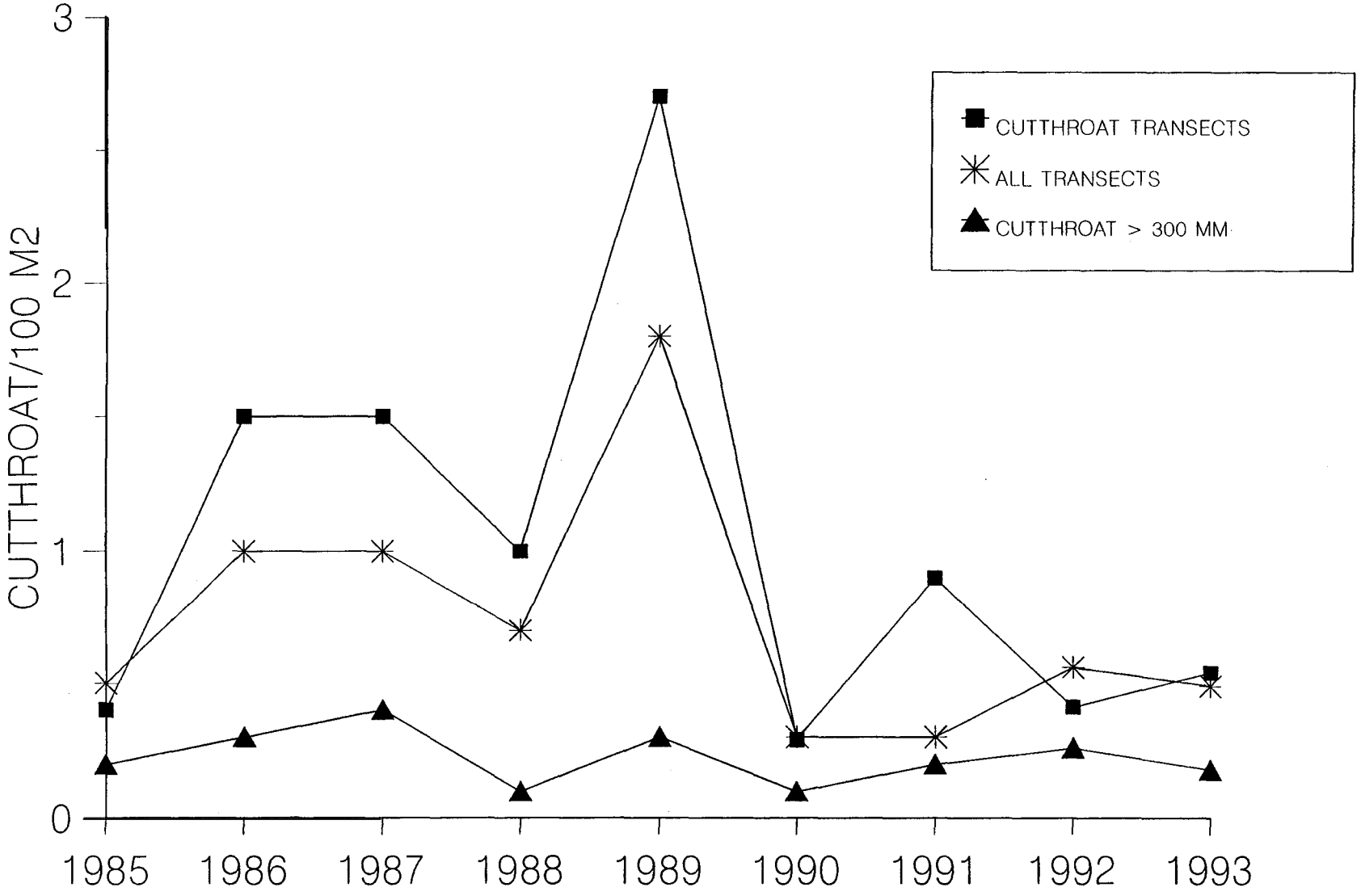

Figure 5. Densities of cutthroat trout counted in all MFSR transects, in cutthroat/chinook only transects (see Table 1) and of cutthroat trout larger than 300 mm in all transects, 1985-93.

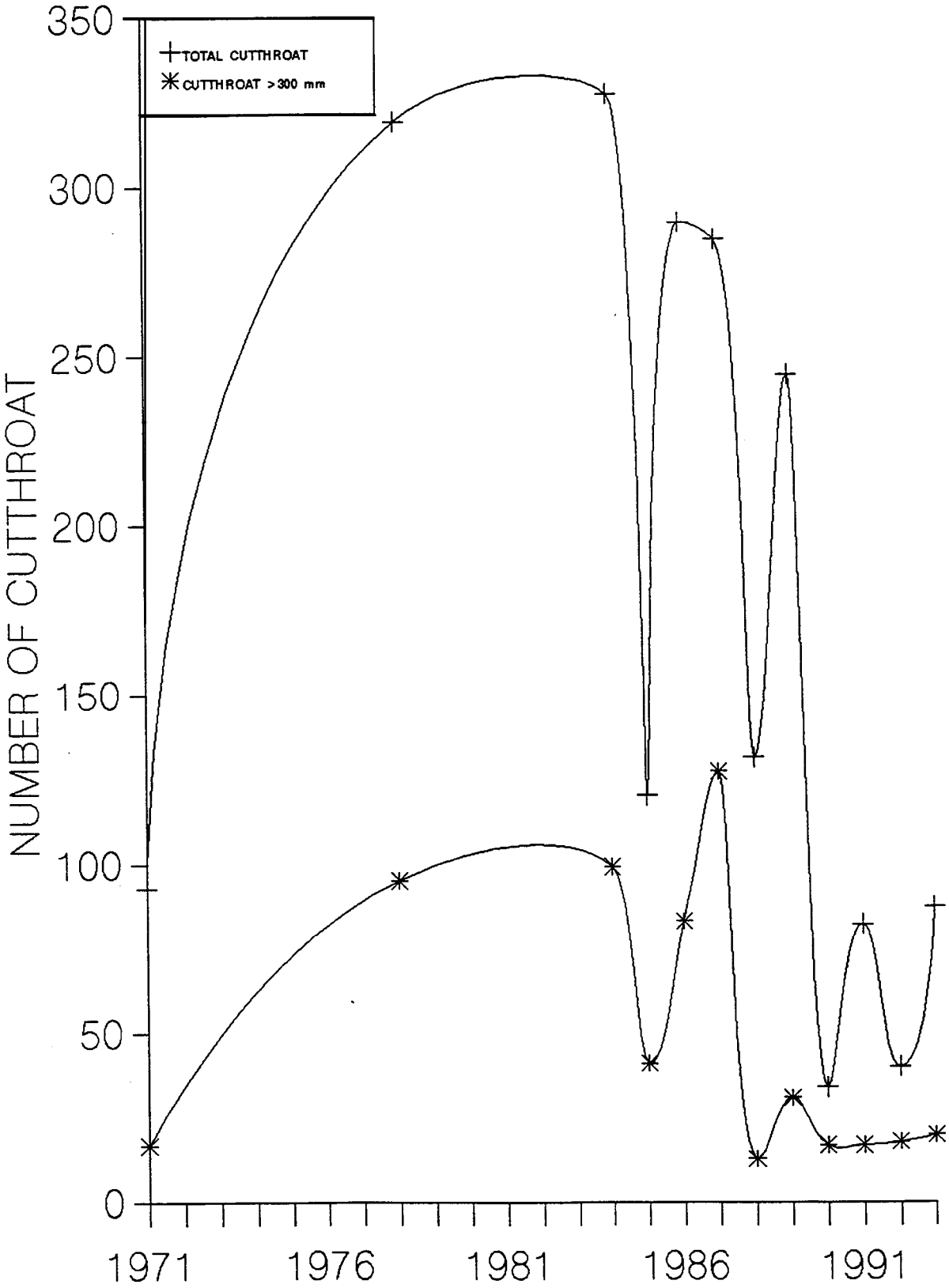

Figure 6. Numbers of cutthroat trout counted in traditional MFSR snorkeling transects (Pungo, Marble Pool, L. Jackass, Whitey Cox, Hospital Pool, Tappan Pool, Flying B, Big Creek Bridge, Ship Island, Otter Bar, and Goat Creek Pool), 1971-92. Otter Bar and Goat Creek Pool not counted in 1993.

be involved. Low levels of precipitation have resulted in approximately seven consecutive years of drought; despite regulation protection, it is possible that cutthroat trout are being lost in the main Salmon River overwintering area due to intense catch-and-release pressure by steelhead anglers, noncompliance, or inadequacy of the protected area; and regulation noncompliance by cutthroat anglers fishing the MFSR.

Middle Fork Salmon River Tributary Snorkeling Transects

Between 1992 and 1993, cutthroat densities varied little in transects snorkeled (Figure 7). Loon Creek cutthroat densities increased from 0.8 to 1.25 fish/100 m^2. Four of the ten transects were newly established. In Pistol Creek #1 and Pistol Creek #2, densities increased from 0.8 to 1.0 and 1.1 to 2.0 fish/100 m^2 over the 1991 counts, respectively. These changes probably reflect no more than normal yearly population fluctuations.

In nine out of the ten transects snorkeled in the MFSR tributaries, no chinook were seen. Camas Creek #1 was the only snorkel transect to contain chinook with a density of 0.07 fish/100 m^2. Chinook densities have been low in all the MFSR tributaries snorkeled since 1990 (Figure 8).

Steelhead densities decreased in Loon Creek #1, Loon Creek #2, and Camas Creek #1 (Figure 9). Marble Creek #1 increased from 0 to 1.02 fish/100 m^2. The two transects not counted in 1992, Pistol Creek #1 and Pistol Creek #2, and decreases from 1991 densities from 4.7 to 2.0 and 3.2 to 1.8 fish/100 m^2, respectively. Densities in all tributaries have declined in the last three years compared to previous years (Figure 9). Juvenile steelhead densities, like chinook, are heavily influenced by yearly spawner escapement.

Salmon River Tributary Snorkeling Transects

The Salmon River tributary transects were established primarily to monitor juvenile steelhead densities. From 1992 to 1993, steelhead densities declined in Bargamin Creek from 7.1 to 5.3 fish/100 m^2 (Figure 10). Steelhead densities in Horse Creek and Chamberlain Creek tributaries increased from 4.4 to 6.5 and 2.2 to 4.3 fish/100 m^2, respectively (Figure 10). Sheep Creek was not snorkeled in 1993.

Salmon River tributaries have traditionally not supported densities of cutthroat trout or chinook compared to MFSR tributaries. From 1992 to 1993, chinook densities decreased in Horse and Chamberlain creeks and increased slightly in Bargamin Creek (Figure 11). Cutthroat trout densities decreased in Horse and Chamberlain creeks and increased in Bargamin Creek (Figure 12). At such low densities and small sample sizes, slight increases and decreases in density are difficult to account for.

CUTTHROAT

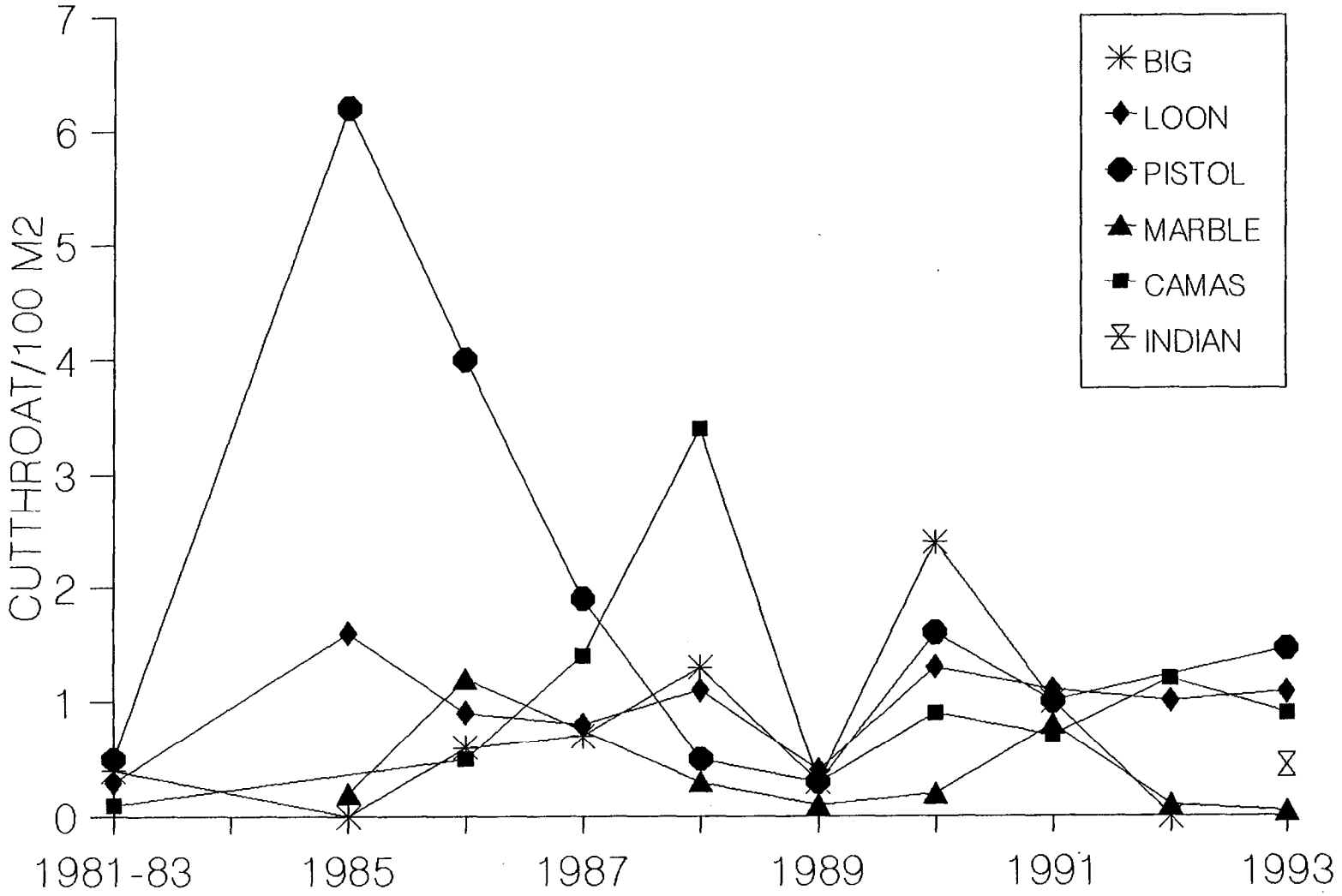

Figure 7. Densities of cutthroat counted in MFSR tributary transects, 1981-1993.

CHINOOK

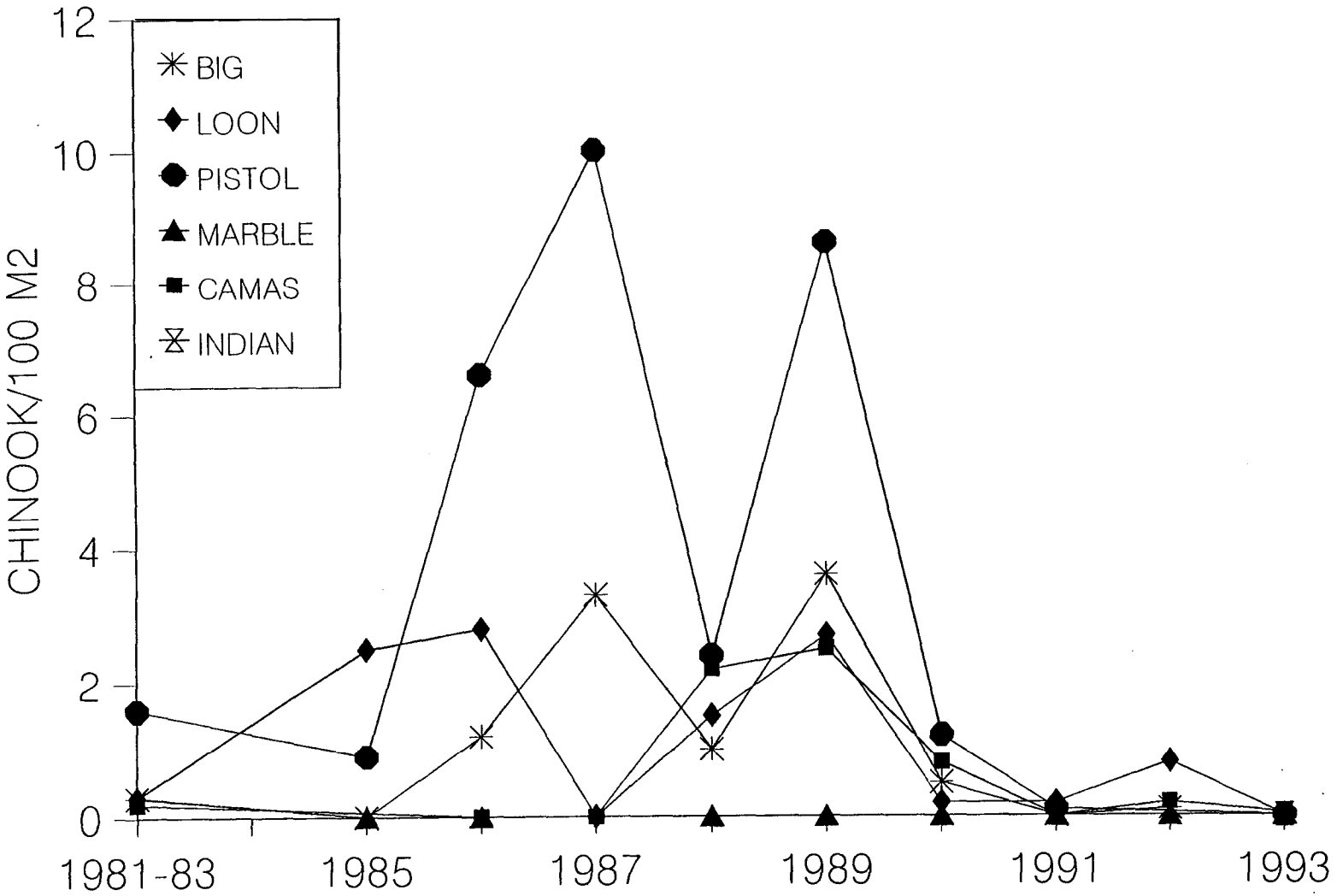

Figure 8. Densities of chinook counted in MFSR tributary transects, 1981-1993.

STEELHEAD

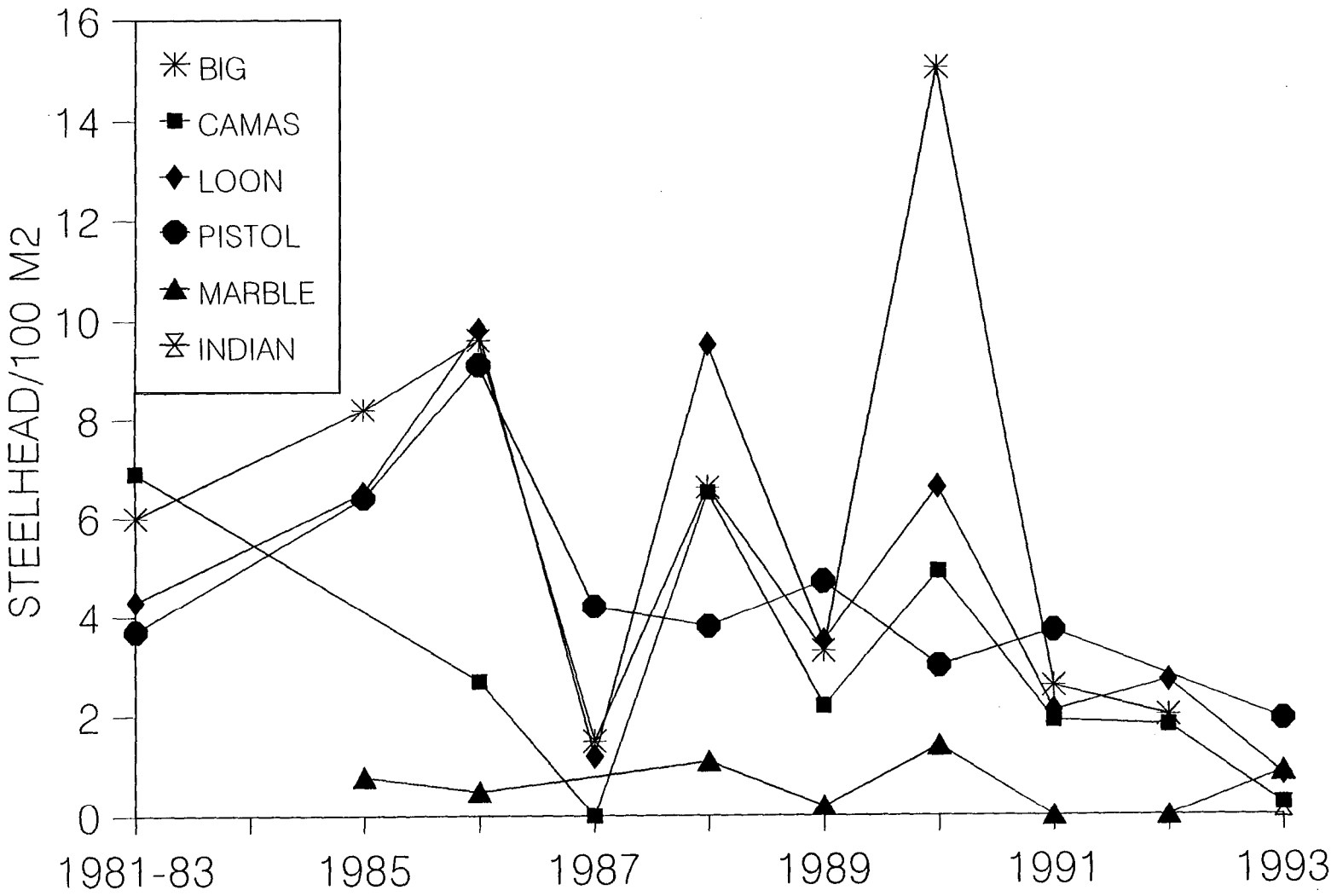

Figure 9. Densities of steelhead/rainbow counted in MFSR transects, 1981-1993. Data for 1981-83 from Thurow (1982, 1983, 1985).

STEELHEAD

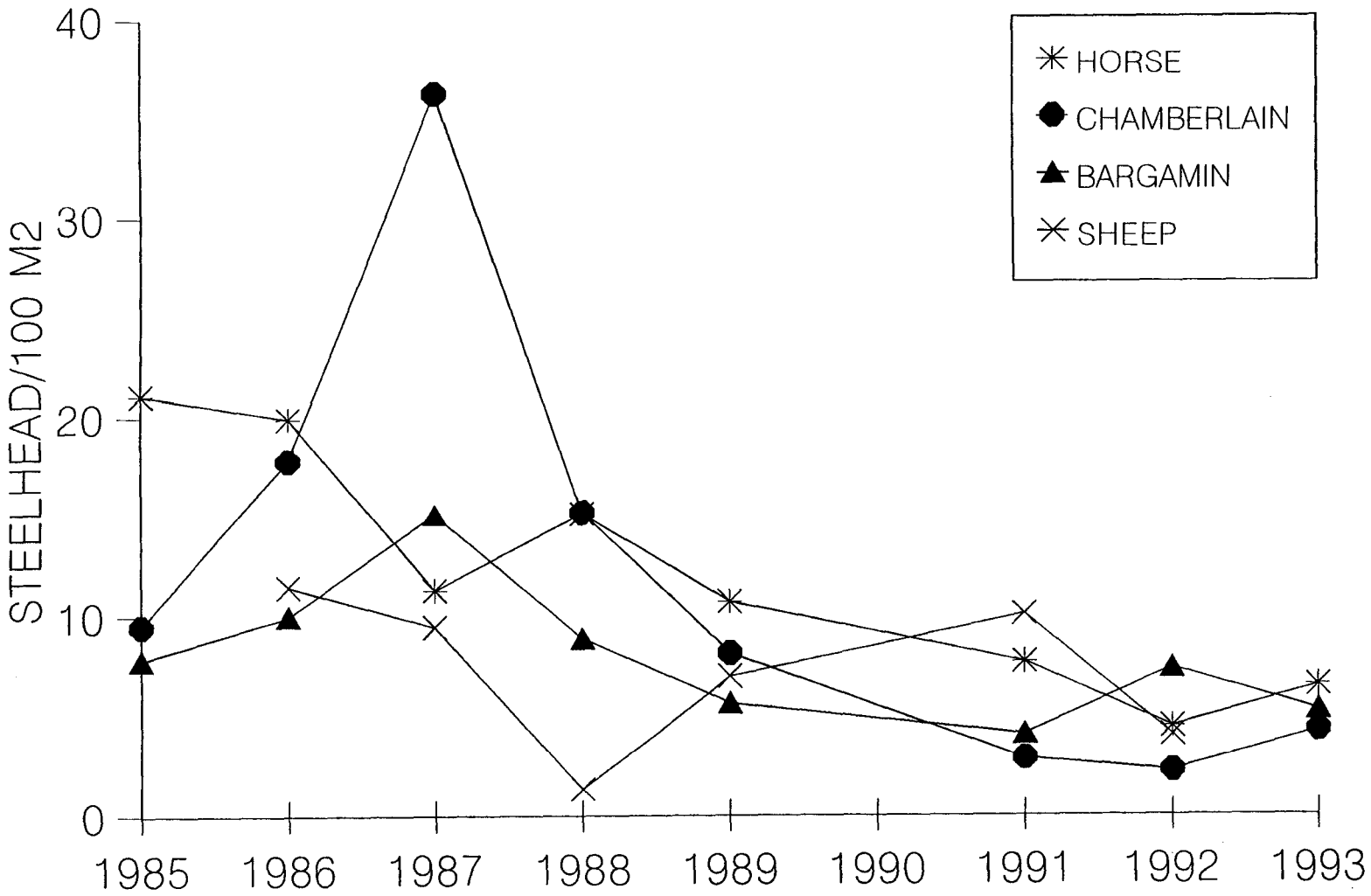

Figure 10. Densities of steelhead/rainbow counted in Salmon River tributary snorkel transects, 1985-93.

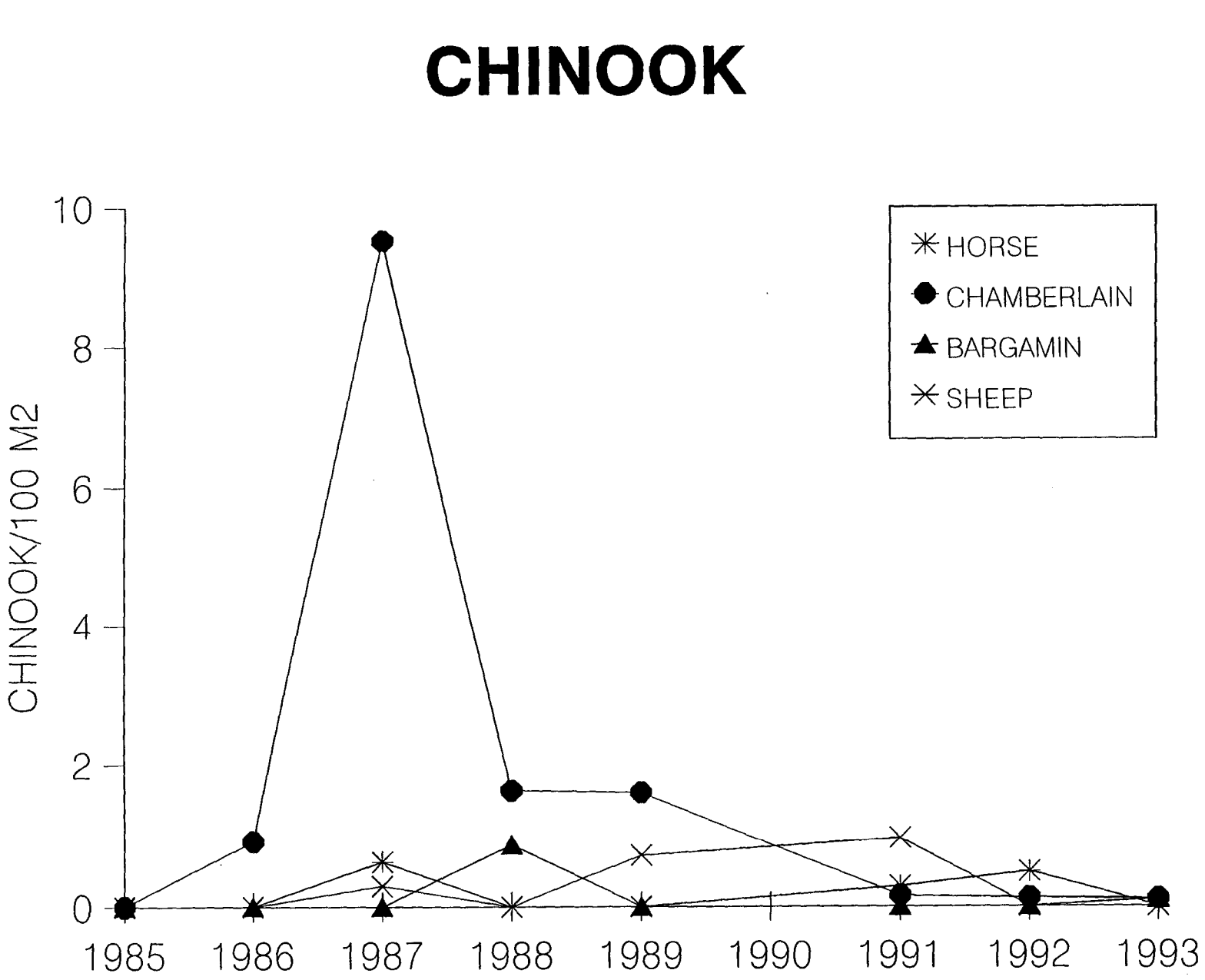

Figure 11. Densities of chinook counted in Salmon River tributary snorkel transects, 1985-93.

CUTTHROAT

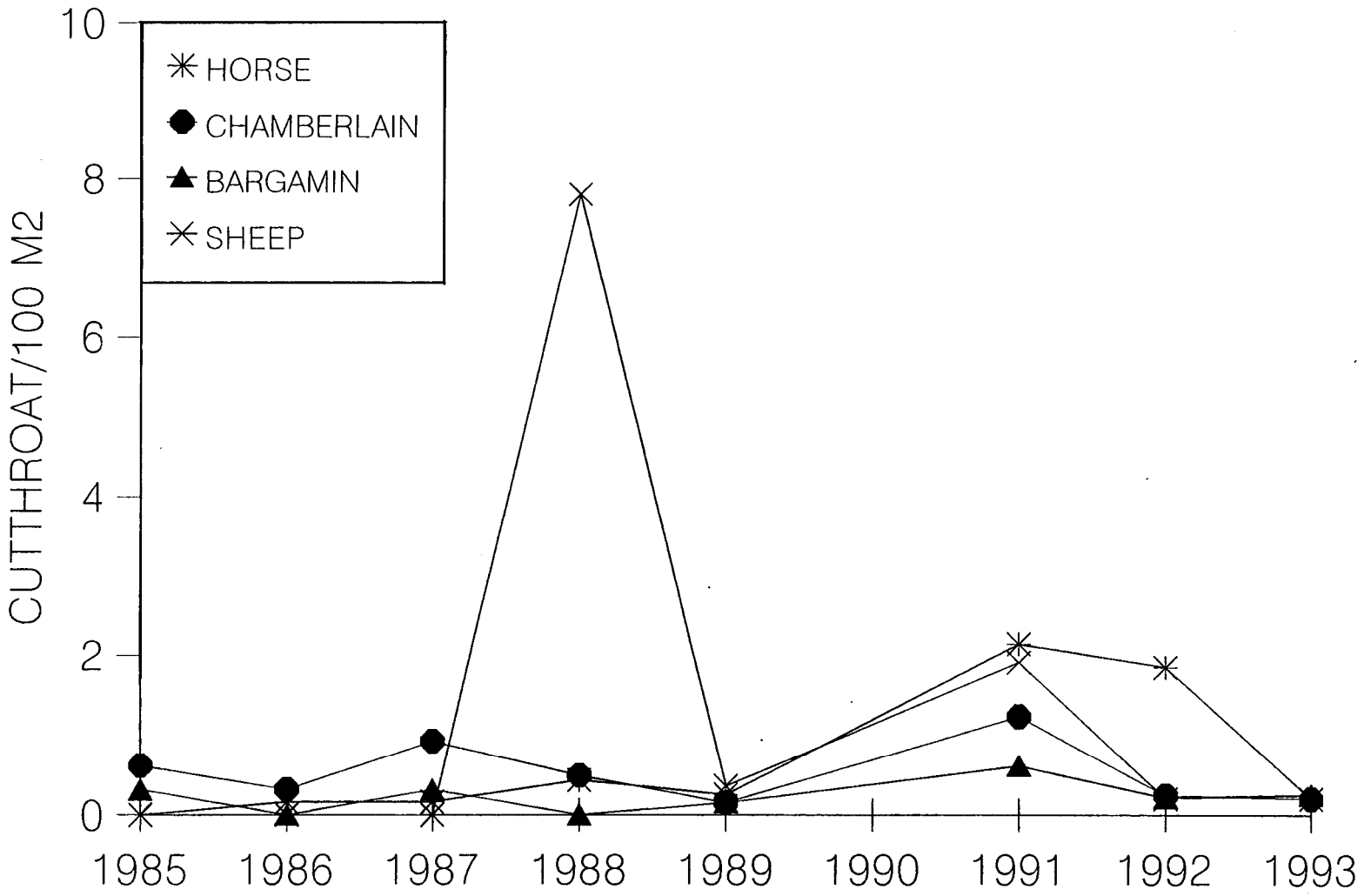

Figure 12. Densities of cutthroat trout counted in Salmon River tributary snorkel transects, 1985-93.

Project Angling

Prior to the establishment of catch-and-release regulations in 1972, the proportion of cutthroat trout larger than 300 mm caught by project anglers was approximately 20% (Figure 13). This proportion has fluctuated yearly, but has averaged 43 % since. The proportion of large cutthroat trout caught in 1993 was 42% . The fluctuation shown in past years is probably the result of variation in sample timing and fish migration patterns.

Since the regulation change, the average length of creeled fish has also increased (17 mm).

RECOMMENDATIONS

1. Continue monitoring densities of juvenile steelhead, cutthroat trout, and chinook salmon in the MFSR and tributaries via snorkeling between the second week of July and the third week of August.

2. Determine total annual mortality of cutthroat trout and compare to other westslope cutthroat trout populations in similar waters with catch-and-release regulations.

3. Employ techniques to determine level of regulation noncompliance in the MFSR.

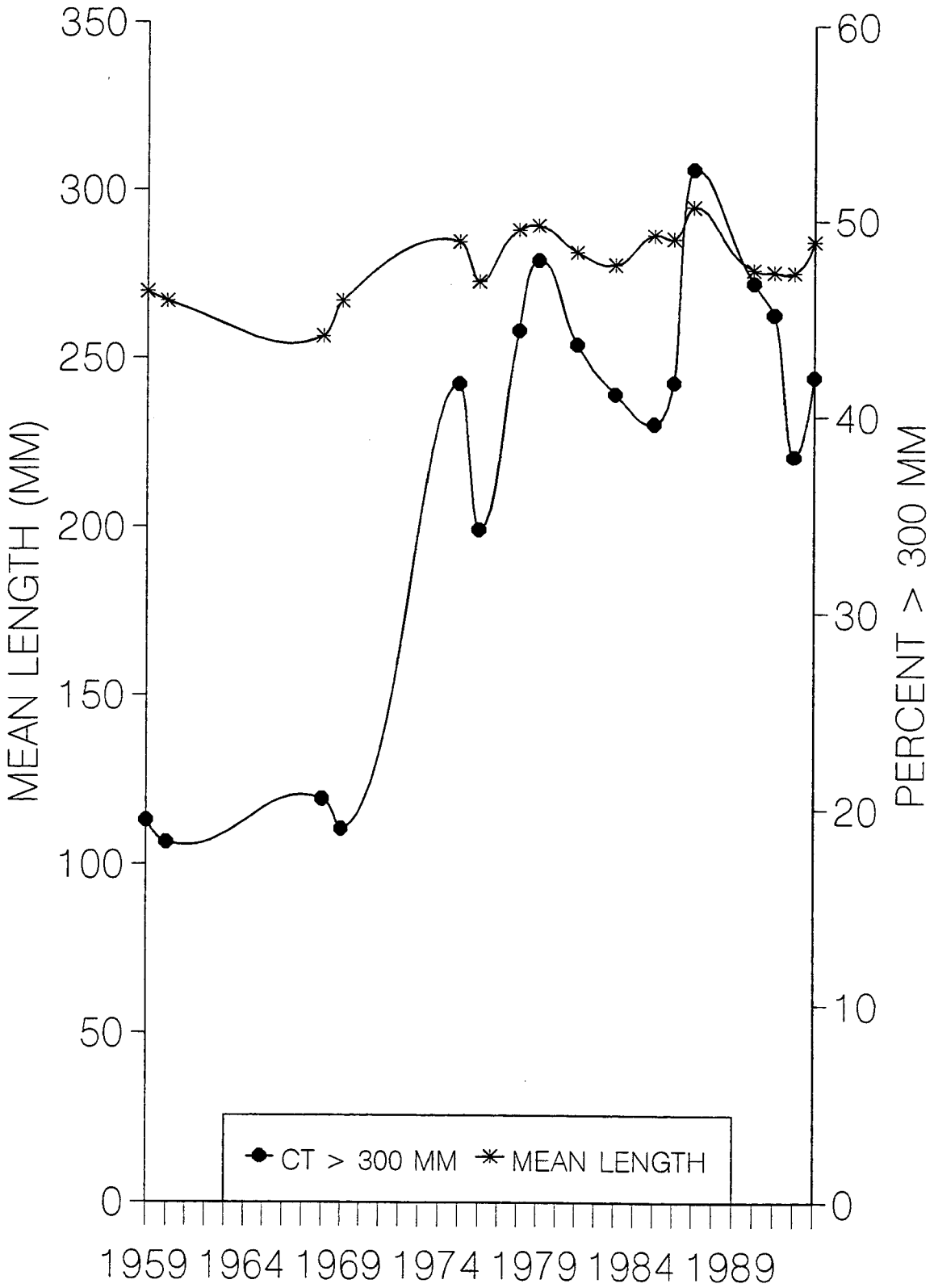

Figure 13. Mean length and proportion of cutthroat trout larger than 300 mm sampled by project angling in the MFSR, 1959-93.

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1993 ANNUAL PERFORMANCE REPORT

State of: Idaho Program: Fisheries Management F-71-R-18

Project I: Surveys and Inventories Subproject I-H: Salmon Region

Job: c^2 Salmon River and North Fork Salmon River Drainage Fishery Surveys Title: Rivers and Streams Investigations

Contract Period: July 1, 1993 to June 30. 1994

ABSTRACT

We surveyed four North Fork Salmon River tributaries, Thompson Creek, and upper Yankee Fork during the summer 1993 to assess fish populations.

Rainbow/steelhead trout *Oncorhynchus mykiss* and/or brook trout *Salvelinus fontinalis* were collected in three of four North Fork Salmon River tributaries. Bull trout *S. confluentus* and cutthroat trout O. *clarki* were collected in upper Yankee Fork, while only cutthroat trout were found in Thompson Creek. Few trout > 200 mm total length were captured. Estimated trout densities (by species) ranged from 1.2 to 10.1 fish/100 m^2. Only trout > 70 mm were used in the density calculation. Physical habitat parameters were also measured for each stream.

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Regional Fishery Biologist

James R. Lukens
Regional Fishery Manager

METHODS

To describe fish species composition, length frequency, and density, we electrofished four North Fork Salmon River tributaries, Thompson Creek, and the upper Yankee Fork during July and August 1993. Fish were captured using backpack, direct-current (DC) electrofishing equipment (Smith-Root 15-A powered by a 300-watt Honda generator). We attempted to capture all sizes of game and nongame fish. A two-pass removal methodology was utilized, with both passes made going upstream and the second pass made immediately after and with similar effort to the first. Though electrofishing stations were not blocked at each end, we assumed fish would not move beyond natural habitat boundaries. Station lengths averaged 100 m.

All fish were anesthetized with tricaine methane-sulfonate (MS-222), identified, and measured to the nearest millimeter total length. We assumed capture probabilities did not vary with species, and we estimated relative abundance using all fish captured. We could not distinguish smaller rainbow trout (< 225 mm) from wild steelhead trout. Although capture probabilities can vary with fish size, length frequency distributions were developed from all fish captured. We used the maximum likelihood estimator to estimate abundance and probability of capture (Van Deventer and Platts 1983).

Density estimates were reported as fish/100 m^2 of transect surface area. Because trout <7 cm were not efficiently sampled, only larger fish were used in the calculations.

RESULTS

Densities of age 1 and older (> 7 cm) rainbow trout/steelhead ranged from 1.2 fish/100 m^2 in Dahlonega Creek to 10.1 fish/100 m^2 in Ditch Creek (Table 1). Cutthroat trout were found in upper Yankee Fork and Thompson Creek with densities of 5.9 and 5.1 fish/100 m^2. Bull trout were also found in upper Yankee Fork at 6.6 fish/100 m^2.

Few trout > 200 mm total length were captured. Length frequency distributions and mean total lengths of trout by species captured are listed for each stream in Appendices A-E.

Physical habitat data collected for each stream are listed in Appendices F-Q.

Table 1. Estimates of trout densities and capture probabilities for North Fork Salmon River tributaries, Yankee Fork and Thompson Creek sampled during July and August 1993. Estimates are for trout > 7 cm total length only.

Site captured	Species	Density (fish/ 100 m^2)	Lower 95% CI	Upper 95% CI	Capture prob (P)	Total
Dahlonega Creek	Rb/Sh	1.2	.96	1.3	.80	4
	Brk	9.8	8.2	11.4	.60	34
Ditch Creek	Rb/Sh	10.1	7.4	12.8	.50	34
Hughes Creek	Rb/Sh	4.5	4.2	4.7	.80	15
Upper Yankee Fork	BT	6.6		13.4	.15	56
	C2	5.9		19	.10	50
Thompson Creek	C2	5.1		84	.10	25

Rb/Sh Rainbow Trout/Steelhead
BT Bull Trout
C2 Cutthroat Trout
Brk Brook Trout

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Appendix A. Length frequency distributions of fish captured in Dahlonega Creek during July 1993.

TL range (mm)	Brook trout x = 87 mm	Rainbow trout x = 181 mm
< 50	3	
50- 59	6	
60- 69	5	
70- 79	3	
80- 89		
90- 99		
100-109		
110-119	1	
120-129	1	
130-139	3	
140-149	3	
150-159		
160-169	2	2
170-179		
180-189		1
190-199		
200-209		
210-219		1
220-229		
230-239		
240-249		
250-259		
260-269		
270-279		
280-289		
290-299		
300-309		
310-319		
320-329		
330-339		
340-349		
350-359		
360-369		
370-379		
380-389		

Appendix A. Continued.

TL range (mm)	Brook trout x = 87 mm	Rainbow trout x = 181 mm
390-399		
400-409		
410-419		
420-429		
430-439		
440-449		
450-459		
460-469		
470-479		
480-489		
490-499 > 500		

Appendix B. Length frequency distribution of fish captured in Thompson Creek during July 1993.

TL range (mm)	Cutthroat trout x = 158 mm
< 50	
50- 59	
60- 69	
70- 79	
80- 89	
90- 99	
100-109	
110-119	1
120-129	1
130-139	
140-149	1
150-159	1
160-169	
170-179	
180-189	
190-199	
200-209	
210-219	
220-229	
230-239	
240-249	
250-259	1
260-269	
270-279	
280-289	
290-299	
300-309	
310-319	
320-329	
330-339	
340-349	
350-359	
360-369	
370-379	
380-389	
390-399	

Appendix B. Continued.

TL range (mm)	Cutthroat trout x = 158 mm
400-409	
410-419	
420-429	
430-439	
440-449	
450-459	
460-469	
470-479	
480-489	
490-499	
> 500	

Appendix C. Length frequency distribution of fish captured in Ditch Creek during August 1993.

TL range (mm)	Rainbow trout x = 93 mm
< 50	
50- 59	
60- 69	2
70- 79	7
80- 89	5
90- 99	4
100-109	2
110-119	2
120-129	1
130-139	
140-149	1
150-159	1
160-169	
170-179	
180-189	
190-199	
200-209	
210-219	
220-229	
230-239	
240-249	
250-259	
260-269	
270-279	
280-289	
290-299	
300-309	
310-319	
320-329	
330-339	
340-349	
350-359	
360-369	
370-379	
380-389	
390-399	

Appendix C. Continued.

TL range (mm)	Rainbow trout x = 93 mm
400-409	
410-419	
420-429	
430-439	
440-449	
450-459	
460-469	
470-479	
480-489	
490-499	
> 500	

Appendix D. Length frequency distributions of fish captured in **Hughes** Creek during July 1993.

TL range (mm)	Rainbow trout x = 111 mm
< 50	2
50- 59	
60- 69	
70- 79	
80- 89	2
90- 99	
100-109	2
110-119	1
120-129	1
130-139	
140-149	1
150-159	1
160-169	
170-179	
180-189	1
190-199	1
200-209	
210-219	
220-229	
230-239	
240-249	
250-259	
260-269	
270-279	
280-289	
290-299	
300-309	
310-319	
320-329	
330-339	
340-349	
350-359	
360-369	
370-379	
380-389	
390-399	

Appendix D. Continued.

TL range (mm)	Rainbow trout x = 111 mm
400-409	
410-419	
420-429	
430-439	
440-449	
450-459	
460-469	
470-479	
480-489	
490-499	
> 500	

Appendix E. Length frequency distributions of fish captured in upper Yankee Fork Salmon River during July 1993.

TL range (mm)	Bull trout x = 115 mm	Cutthroat trout x = 110 mm
< 50		
50- 59		
60- 69		5
70- 79		3
80- 89		1
90- 99		
100-109	11	
110-119	10	1
120-129	7	2
130-139	4	6
140-149		
150-159		1
160-169		1
170-179		
180-189		
190-199		
200-209		1
210-219		
220-229		
230-239		
240-249		
250-259		
260-269		
270-279		
280-289		
290-299		
300-309		
310-319		
320-329		
330-339		
340-349		
350-359		
360-369		
370-379		
380-389		
390-399		

Appendix E. Continued.

TL range (mm)	Bull trout x = 115 mm	Cutthroat trout x = 110 mm
400-409		
410-419		
420-429		
430-439		
440-449		
450-459		
460-469		
470-479		
480-489		
490-499		
> 500		

Appendix F.

FISH SURVEY

Stream Hughes Creek Date 8/ 9/93 Leader/Recorder Weston & Rea

Agency: Idaho Department of Fish and Game

Program: (circle your region) R1, R2, R3-N, R3-M, R4, R5, R6, (R7)

Stratum _____ Section _____

Channel Type: (B,) C, Other Section Type: (monitoring,) chinook sup., steelhead sup., evaluation

Quad Map _____ UTM X/Y _____

EPA Reach # _____

Length 68.9m Transect Widths 5m, 4.3m, 5.1m, 3.8m, 6.2m

H_2O Temp. 11°C Time 1000 Mean Width 4.9m

Conductivity 35 µS SEC Area _____

Corridor visibility _____m

Methods: ( ) Snorkel (circle corridor or entire stream width)
(X) Electrofish
( ) Other _____

Habitat Type: (circle one) (Pool,) (Riffle,) (Run,) Pocket Water

Appendix G.

IDAHO DEPARTMENT OF FISH AND GAME
Stream Physical Habitat Data

Stream Hughes Creek Date 8/9/93 Collectors Weston & Rea
Section _____ Transect length (m) 10.7m Mean transect width (m) 4.9m Temp 11°C
Observer eye height (m) _____ Stadia meas. (m) _____ Gradient (%) _____
Channel type: (B) - confined, flushing Percent habitat type: pool 30 riffle 40 run 30
C - meandering, depositional pocket water _____
Comments (vegetative cover, bank stability, etc.) Good - trees/shrubs/ present to edge - some undercuts, riparian gras

Transect length from bottom	Width (m)	Data site on transect (l to r)	Depth (cm)	Velocity (run only)	Percent substrate class by area				
					Sand <0.18"	Gravel 0.19-2.9"	Rubble 3-11.9"	Boulder >12"	Bedrock
0m	5M	1/4	35 cm		-	65	35	-	-
		1/2	34		35	5	60	-	-
		3/4	30		90	10	-	-	-
17.2m	4.3m	1/4	49	0.86m/sec	10	80	10	-	-
		1/2	50		-	60	20	20	-
		3/4	26		60	40	-	-	-
34.4m	5.1m	1/4	12		-	10	90	-	-
		1/2	18		-	60	40	-	-
		3/4	20		35	15	50	-	-
51.7m	3.8m	1/4	18		-	15	85	-	-
		1/2	33	0.98m/sec	-	50	40	10	-
		3/4	20		20	20	60	-	-
68.9m	6.2m	1/4	13	0.92m/sec	-	25	75	-	-
		1/2	15		-	30	70	-	-
		3/4	13		-	25	75	-	-

Appendix H.

FISH SURVEY

Stream Twin Creek Date 7/23/93 Leader/Recorder Weston & Rea

Agency: Idaho Department of Fish and Game

Program: (circle your region) R1, R2, R3-N, R3-M, R4, R5, R6, (R7)

Stratum _____ Section _____

Channel Type: (B,) C, Other Section Type: (monitoring,) chinook sup., steelhead sup., evaluation

Quad Map Gibbonsville UTM X/Y _____

EPA Reach # _____

Length 91.44m Transect Widths 5.5m, 4m, 3.7m, 5.3m, 5.4m

H_2O Temp. 8°C Time 1100 Mean Width 4.8m

Conductivity 28 µS SEC Area _____

Corridor visibility _____m

Methods: ( ) Snorkel (circle corridor or entire stream width)
(X) Electrofish
( ) Other _____

Habitat Type: (circle one) Pool, (Riffle,) Run, Pocket Water

Appendix I.

IDAHO DEPARTMENT OF FISH AND GAME
Stream Physical Habitat Data

Stream Twin Creek Date 7/23/93 Collectors Weston & Rea
Section _____ Transect length (m) 91.4m Mean transect width (m) 4.8m Temp 8°C
Observer eye height (m) _____ Stadia meas. (m) _____ Gradient (%) _____
Channel type: (B) - confined, flushing Percent habitat type: pool 10 riffle 80 run 10
C - meandering, depositional pocket water _____
Comments (vegetative cover, bank stability, etc.) Exc. bank stability - forested to water's edge (shrubs,trees,ferns, grasse

Transect length from bottom	Width (m)	Data site on transect (l to r)	Depth (cm)	Velocity (run only)	Percent substrate class by area				
					Sand <0.18"	Gravel 0.19-2.9"	Rubble 3-11.9"	Boulder >12"	Bedrock
0	5.5m	1/4	24		10		75	15	
		1/2	40	0.84m/sec	20	30		50	
		3/4	19		20	70	10		
22.9m	4m	1/4	30			20	30	50	
		1/2	17		5		5	90	
		3/4	38				100		
45.7m	3.7m	1/4	40		5	10	85		
		1/2	38	0.79m/sec			60	40	
		3/4	23		25	35		40	
68.6m	5.3m	1/4	11	0.82m/sec	5	20	75		
		1/2	25		10	20	70		
		3/4	17				100		
91.4m	5.4m	1/4	15		10	40	50		
		1/2	9		20	30	20	30	
		3/4	35		5		60	35	

Appendix J.

FISH SURVEY

Stream Dahlonega Date 7/20/93 Leader/Recorder Weston

Agency: Idaho Department of Fish and Game

Program: (circle your region) R1, R2, R3-N, R3-M, R4, R5, R6, (R7)

Stratum _____ Section _____

Channel Type: (B,) C, Other Section Type: (monitoring,) chinook sup., steelhead sup., evaluation

Quad Map Gibbonsville UTM X/Y _____

EPA Reach # _____

Length 91.44m Transect Widths 3.8m, 4.1m, 3.4m, 4.4m, 3.5

H_2O Temp. 17°C Time 1300-1800 Mean Width 3.8m

Conductivity _____µS SEC Area _____

Corridor visibility _____m

Methods: ( ) Snorkel (circle corridor or entire stream width)
(X) Electrofish
( ) Other _____

Habitat Type: (circle one) Pool, Riffle, (Run,) Pocket Water

Appendix K.

IDAHO DEPARTMENT OF FISH AND GAME
Stream Physical Habitat Data

Stream Dahlonega Date 7/20/93 Collectors Weston & Rea
Section _____ Transect length (m) 91.4m Mean transect width (m) 3.8m Temp 17°C
Observer eye height (m) _____ Stadia meas. (m) _____ Gradient (%) _____
Channel type: B - confined, flushing Percent habitat type: pool 10 riffle 10 run 80
C - meandering, depositional pocket water _____
Comments (vegetative cover, bank stability, etc.) 100% covered by trees and shrubs - excellent stability.

Transect length from bottom	Width (m)	Data site on transect (l to r)	Depth (cm)	Velocity (run only)	Percent substrate class by area				
					Sand <0.18"	Gravel 0.19-2.9"	Rubble 3-11.9"	Boulder >12"	Bedrock
0	3.8m	1/4	7.6		5	50	45		
		1/2	17.8			60	40		
		3/4	20.3			40	60		
22.9m	4.1m	1/4	43.2		95	5			
		1/2	43.2		20	20	60		
		3/4	35.6		100				
45.7m	3.4m	1/4	12.7	0.85m/sec	70	15	15		
		1/2	22.9		5	85	10		
		3/4	17.8		10	50	40		
68.6m	4.4m	1/4	17.8	1.15m/sec	20		80		
		1/2	17.8		5	25	70		
		3/4	15.2		15	20	65		
91.4m	3.5m	1/4	10.2	1.0m/sec	20	10	70		
		1/2	17.8		5	20	75		
		3/4	25.4		20	30	50		

Stream Ditch Creek Date 8/10/93 Leader/Recorder Weston & Rea

Agency: Idaho Department of Fish and Game

Program: (circle your region) R1, R2, R3-N, R3-M, R4, R5, R6, (R7)

Stratum _____ Section _____

Channel Type: (B,) C, Other Section Type: (monitoring,) chinook sup., steelhead sup., evaluation

Quad Map Gibbonsville UTM X/Y _____

EPA Reach # _____

Length 91.4m Transect Widths 4.7m, 4.2m, 3.2m, 3.5m, 2.8m

H_2O Temp. 12°C Time 1130 Mean Width 3.7m

Conductivity 25 µS SEC Area _____

Corridor visibility _____m

Methods: ( ) Snorkel (circle corridor or entire stream width)
(X) Electrofish
( ) Other _____

Habitat Type: (circle one) Pool, (Riffle,) Run, Pocket Water

Appendix M.

IDAHO DEPARTMENT OF FISH AND GAME
Stream Physical Habitat Data

Stream Ditch Creek Date 8/10/93 Collectors Weston & Rea
Section _____ Transect length (m) 91.4m Mean transect width (m) 3.7m Temp 12°C
Observer eye height (m) _____ Stadia meas. (m) _____ Gradient (%) _____
Channel type: (B) - confined, flushing Percent habitat type: pool 20 riffle 70 run 10
C - meandering, depositional pocket water _____
Comments (vegetative cover, bank stability, etc.) Excellent - forested stream banks.

Transect length from bottom	Width (m)	Data site on transect (l to r)	Depth (cm)	Velocity (run only)	Percent substrate class by area				
					Sand <0.18"	Gravel 0.19-2.9"	Rubble 3-11.9"	Boulder >12"	Bedrock
0	4.7m	1/4	11		40	10	50		
		1/2	25		10	15	75		
		3/4	10		70	5		25	
22.9m	4.2m	1/4	4		15	65	20		
		1/2	8	0.71m/sec	10		90		
		3/4	5		10	10	40	40	
45.7m	3.2m	1/4	4			40	60		
		1/2	15			40	25	35	
		3/4	23			50	50		
68.6m	3.5m	1/4	13				20	80	
		1/2	19				40	60	
		3/4	8				25	75	
91.4m	2.8m	1/4	25		20	20	60		
		1/2	15		5	25	50	20	
		3/4	26		10	30	60		

Appendix N.

FISH SURVEY

Stream Thompson Creek Date 7/14/93 Leader/Recorder Liter

Agency: Idaho Department of Fish and Game

Program: (circle your region) R1, R2, R3-N, R3-M, R4, R5, R6, (R7)

Stratum _____ Section _____

Channel Type: (B,) C, Other Section Type: (monitoring,) chinook sup., steelhead sup., evaluation

Quad Map _____ UTM X/Y _____

EPA Reach # _____

Length 91.4m Transect Widths 5m, 6.7m, 6.1m, 4.3m, 5m

H_2O Temp. 7°C Time AM Mean Width 5.4m

Conductivity 80 µS SEC Area _____

Corridor visibility _____m

Methods: ( ) Snorkel (circle corridor or entire stream width)
(X) Electrofish
( ) Other _____

Habitat Type: (circle one) (Pool,) (Riffle,) (Run,) (Pocket Water)

Appendix O.

IDAHO DEPARTMENT OF FISH AND GAME
Stream Physical Habitat Data

Stream Thompson Creek Date 7/14/93 Collectors Liter, Weston, & Rea
Section _____ Transect length (m) 91.4m Mean transect width (m) 5.4m Temp 7°C
Observer eye height (m) _____ Stadia meas. (m) 25.5/15 @ 100 ft. Gradient (%) _____
Channel type: (B) - confined, flushing Percent habitat type: pool 10 riffle 75 run 10
C - meandering, depositional pocket water 5
Comments (vegetative cover, bank stability, etc.) 75% covered by willow, dogwood; Good stable banks.

Transect length from bottom	Width (m)	Data site on transect (l to r)	Depth (cm)	Velocity (run only)	Percent substrate class by area				
					Sand <0.18"	Gravel 0.19-2.9"	Rubble 3-11.9"	Boulder >12"	Bedrock
0	5m	1/4	25.4	0.83m/sec	10	20	50	20	
		1/2	33		5	15	40	40	
		3/4	30.4		5	25	70		
22.9m	6.7m	1/4	15.2	0.84m/sec	5	45	50		
		1/2	17.8		5	15	80		
		3/4	20.3		15	15	70		
45.7m	6.1m	1/4	20.3	0.835m/sec	10	20	30	40	
		1/2	22.9			10	20	70	
		3/4	22.9			10	10	80	
68.6m	4.3m	1/4	12.7		10	40	50		
		1/2	30.4				100		
		3/4	12.7		15	40	45		
91.4m	5m	1/4	17.8			80	20		
		1/2	30.4			15	85		
		3/4	22.9		5	45	50		

Appendix P

FISH SURVEY

Stream Upper Yankee Fork Date 7/13/93 Leader/Recorder Liter

Agency: Idaho Department of Fish and Game

Program: (circle your region) R1, R2, R3-N, R3-M, R4, R5, R6, (R7)

Stratum _____ Section _____

Channel Type: B, (C), Other Section Type: (monitoring,) chinook sup., steelhead sup., evaluation

Quad Map _____ UTM X/Y _____

EPA Reach # _____

Length 169m Transect Widths 4.6m, 4.5m, 2.7m, 7.9m, 5.3m

H_2O Temp. 13°C Time 0100-1700 Mean Width 5m

Conductivity 1.75 µS SEC Area _____

Corridor visibility _____m

Methods: ( ) Snorkel (circle corridor or entire stream width)
(X) Electrofish
( ) Other _____

Habitat Type: (circle one) (Pool,) (Riffle,) (Run,) (Pocket Water)

Appendix Q.

IDAHO DEPARTMENT OF FISH AND GAME
Stream Physical Habitat Data

Stream Upper Yankee Fork Date 7/13/93 Collectors Liter, Weston, & Rea
Section ____ Transect length (m) 169m Mean transect width (m) 5m Temp 13°C
Observer eye height (m) 6' (ML) Stadia meas. (m) ____ Gradient (%) ____
Channel type: B - confined, flushing Percent habitat type: pool 5 riffle 70 run 20
(C) - meandering, depositional pocket water 5
Comments (vegetative cover, bank stability, etc.) Banks stable w/ 90% covereage by 50/50 mix grass/willow.

Transect length from bottom	Width (m)	Data site on transect (l to r)	Depth (cm)	Velocity (run only)	Percent substrate class by area				
					Sand <0.18"	Gravel 0.19-2.9"	Rubble 3-11.9"	Boulder >12"	Bedrock
0	4.6m	1/4	28.6	0.65m/sec	30	30	20	20	
		1/2	36.8		20	60	5	15	
		3/4	40		5	10	25	60	
52m	4.5m	1/4	35.6		15	25	25	35	
		1/2	35.6		10	20	70		
		3/4	27.9		25	25	50		
67m	2.7m	1/4	30.5	1.1m/sec	40	30	30		
		1/2	27.9		10	5	15	70	
		3/4	27.9		5	30	40	25	
110m	7.9m	1/4	20.3		15	15	70		
		1/2	22.9			25	75		
		3/4	25.4		20	20	60		
169m	5.3m	1/4	27.9		5	15	80		
		1/2	27.9		10	10	60	20	
		3/4	33		50	10	40		

1993 ANNUAL PERFORMANCE REPORT

State of: Idaho | Program: Fisheries Management F-71-R-18

Project I: Surveys and Inventories | Subproject I-H: Salmon Region

Job: d | Title: Salmon and Steelhead Investigations

Contract Period: July 1, 1993 to June 30, 1994

ABSTRACT

Juvenile anadromous fish density counts were conducted in the Middle Fork Salmon River and mainstem Salmon River in July and August 1993. This information is reported in a previous section of this report (see Job 7-c[1]).

Department personnel conducted annual chinook salmon *Oncorhynchus tshawytscha* redd counts in the Marsh Creek drainage, Salmon River, Lemhi River, East Fork Salmon River, and the Yankee Fork Salmon River. This data is included in the annual salmon spawning ground surveys report.

Authors:

Mark Liter
Regional Fishery Biologist

James R. Lukens
Regional Fishery Manager

1993 ANNUAL PERFORMANCE REPORT

State of: Idaho Program: Fisheries Management F-71-R-18

Project II: Technical Guidance Subproject II-H: Salmon Region

Contract Period: July 1, 1993 to June 30, 1994

ABSTRACT

Technical assistance was provided to all state and federal agencies upon request. Comments were submitted to various agencies and private entities concerning stream alterations, bank stabilizations, mining operations and reclamation plans, fish rearing proposals, private ponds, water right applications, gravel removal projects, grazing allotments, timber sales, highway reconstruction, habitat improvements, bridge construction, and hydropower projects. On-site inspections of proposed, on-going, and completed projects were conducted.

We also responded to the general public in person, by telephone, and by mail to inquiries about fishing opportunities, techniques, regulations, and area specifics.

Authors:

Mark Liter
Regional Fishery Biologist

James R. Lukens
Regional Fishery Manager

OBJECTIVES

1. To furnish technical assistance, advice, guidance, and comments to other federal, state, and local agencies, organizations, or individuals regarding any items, projects, or activities associated with or potentially affecting fishery resources and habitat in the region.

2. To provide information on all aspects of fisheries and aquatic habitat as requested.

METHODS

We responded to all requests for data, expertise, and recommendations from individuals, government agencies, and corporations. Meetings were attended, field inspections conducted, and responses generated as appropriate.

RESULTS

From July 1, 1993 to June 30, 1994, we responded in writing to requests for technical assistance or comments on various water and fishery-related matters as follows:

Agency	Number of requests
Idaho Department of Water Resources	24
U.S. Forest Service	18
Private and Miscellaneous	10
Idaho Outfitters & Guides Licensing Board	2
Trout Unlimited	1
Idaho Department of Transportation	1

Telephone communication was the major mode of interagency contact. Commonly, we responded to stream alteration proposals by meeting with the applicant on-site, determining the nature of the situation, and sending written comments to the appropriate agency. Due to the remoteness of the Salmon Region, we were often the only agency representatives available to conduct on-site inspections.

We responded to numerous inquiries from the public (by telephone, letter, and in person) about when, where, and how to participate in various fisheries in the region ranging from steelhead angling to alpine lake fishing.

We reported weekly steelhead fishing results on the local radio station and in area newspapers throughout the season.

RECOMMENDATIONS

1. Technical guidance on issues involving fishery resources in the Salmon Region should be continued to assist in maintaining fishery resources in the region.

2. Because of the number of requests for technical guidance and the potential impacts of projects to remaining fish resources in the Salmon Region, consideration should be given to adding additional staff in the region to administer to habitat issues.

1993 ANNUAL PERFORMANCE REPORT

State of: Idaho Program: Fisheries Management F-71-R-18

Project IV: Population Management Subproject IV-H: Salmon Region

Contract Period: July 1, 1993 to June 30, 1994

ABSTRACT

In 1993, we stocked 26 alpine lakes in the Challis National Forest (north) and 46 lakes in the White Cloud Peaks. A Hughes 500D helicopter was used to stock the lakes for a cost of $44.22 per lake ($3,184.00 total). A total of 15,110 fry were stocked in Challis National Forest (north) lakes: 10,910 cutthroat trout *Oncorhynchus clarki*, 250 rainbow trout *O. mykiss*, 3,950 Arctic grayling *Thymallus arcticus*. In the White Cloud Peaks, 25,250 fry were stocked: 23,000 cutthroat trout, 500 rainbow trout, and 1,750 grayling. No golden trout *O. aguabonita* fry were available this year.

Regional personnel stocked six lakes with bull trout *Salvelinus confluentus* or Kamloops strain rainbow trout in an attempt to control stunted brook trout *S. fontinalis* and create diversity in mountain lake fishing opportunity. Lakes stocked with bull trout included Upper Champion, Toxaway, and Mosquito Flats Reservoir, while Kamloops rainbow trout were introduced in Carlson Lake and Mable Lakes 1 and 2.

Authors:

James R. Lukens Regional
Fishery Manager

Mark Liter
Regional Fishery Biologist

OBJECTIVES

1. To evaluate the Salmon Region mountain lake fish stocking program.

2. To collect baseline fisheries data to evaluate the introduction of predators in selected Salmon Region mountain lakes with stunted brook trout *Salvelinus fontinalis* populations.

INTRODUCTION

Department personnel have stocked mountain lakes with a variety of salmonid predator species in an attempt to increase the size of stunted brook trout populations. Brown trout *Salmo trutta,* fall chinook salmon *Oncorhynchus tshawytscha,* atlantic salmon *Salmo salar,* and rainbow trout *Oncorhynchus mykiss* have been used with varying degrees of success (Scully and Anderson 1989, Grunder and Anderson 1991, Janssen and Anderson 1992, Janssen and Patterson, in press).

In an attempt to diversify mountain lake fishing opportunities and control stunted brook trout, Department personnel introduced predatory fish into six lakes.

METHODS

The bull trout S. *confluentus* stocked during 1993 in Toxaway and Upper Champion lakes and Mosquito Flats Reservoir were reared at Cabinet Gorge Hatchery to an average size of 27.8 cm. Gerrard rainbow trout stocked in Mable Lakes #1 and #2 and Carlson Lake were reared at Nampa Hatchery to an average length of 25.4 cm.

Trout were loaded into a 150-gallon "Bambi bucket" suspended below a U.S. Forest Service Llama helicopter. Approximately 200 fish per load were flown into the lakes.

In 1992, fish population status in each lake was determined by gill nets. Two sinking monofilament gill nets, 150 ft x 6 ft with mesh ranging from 3/4-in to 2.5-in, were set overnight in each lake. Gill nets were set perpendicular to shore with the small mesh near shore. Fish collected were measured and weighed.

Regional personnel stocked six lakes with bull trout or Gerrard strain rainbow trout in an attempt to control stunted brook trout and create diversity in mountain lake fishing opportunity. Lakes stocked with bull trout included Upper Champion, Toxaway, and Mosquito Flats Reservoir, while Gerrard rainbow trout were introduced in Carlson, Mable Lake #1, and Mable Lake #2 (Table 1).

Table 1. Lakes stocked with predatory fish (bull trout or Gerrard strain rainbow trout) in 1993.

Catalog number	Lake name	Number stocked	Species[a]	Average length (cm)
07-1731	Upper Champion	108	BU	27.8
07-1749	Toxaway	1,076	BU	27.8
07-1327	Mosquito Flats Res.	500	BU	27.8
07-1303	Carlson	702	K2	25.4
07-1115	Mable #1	270	K2	25.4
07-1117	Mable #2	490	K2	25.4
	Totals	1,684	BU	
		1,462	K2	

[a]BU = bull trout, K2 = Gerrard strain rainbow trout (Kamloops)

RESULTS

A total of 1,684 bull trout averaging 27.8 cm in length were stocked in three lakes: 108 in Upper Champion Lake, 1,076 in Toxaway Lake, and 500 in Mosquito Flats Reservoir. A total of 1,462 Gerrard strain rainbow trout averaging 25.4 cm in length were stocked in three other lakes: 702 in Carlson Lake, 270 in Mable Lake #1, and 490 in Mable Lake #2 (Table 1).

Bull trout stocking densities ranged from 22/hectare (9/acre) in Toxaway Lake to 90/hectare (36/acre) in Upper Champion Lake. Kamloops rainbow trout stocking densities ranged from 174/hectare (70/acre) in Carlson Lake to 605/hectare (245/acre) in Mable Lake #2.

During the summers of 1994 and 1995, Department personnel will begin surveying each lake to determine what effects the experimental bull trout and Gerrard strain rainbow trout populations have had in each lake.

In 1993, we stocked 26 alpine lakes in the Challis National Forest (north) and 46 lakes in the White Cloud Peaks. A Hughes 500D helicopter was used to stock the lakes for a cost of $44.22 per lake ($3,184.00 total). A total of 15,110 fry were stocked in Challis National Forest (north) lakes: 10,910 cutthroat trout, 250 rainbow trout, and 3,950 grayling (Table 2). In the White Cloud Peaks, 24,500 fry were stocked: 23,000 cutthroat trout, 500 rainbow trout, and 1,000 grayling (Table 3). No golden trout fry were available for planting this year.

RECOMMENDATIONS

1. Continue mountain lake surveys to evaluate fish growth, survival, and angler use.

2. Monitor and evaluate impacts predator introductions have had on brook trout populations.

Table 2. Alpine lakes in the Challis National Forest (north) stocked with fry, 1993.

Catalog number	Lake name	GPS coordinates		Number stocked	Species[a]
		Latitude	Longitude		
07-1333	Challis Creek #2	44.33.00	114.31.02	250	C2
07-1335	Challis Creek #3	44.33.16	114.31.30	250	C2
07-1328	West Fork Bear Creek #1	44.34.00	114.29.30	250	C2
07-1319	Twin Creek #2	44.34.96	114.28.60	250	Rl
07-0837	Castle #2	44.47.81	114.22.47	250	C2
07-0835	Castle #1	44.48.02	114.22.32	250	C2
07-0815	Martindale #1	44.49.80	114.36.96	950	GR
07-0816	Martindale #2	44.49.91	114.37.20	750	C2
07-0810	Woodtick Creek #2	44.48.74	114.39.02	650	GR
07-0813	Woodtick Creek #3	44.48.16	114.40.56	500	C2
07-0818	West Fork Camas #1	44.47.95	114.38.99	500	C2
07-0820	West Fork Camas #3	44.47.78	114.39.76	750	C2
07-0824	West Fork Camas #5	44.47.83	114.40.15	500	C2
07-0845	Cashe Creek #3	44.46.55	114.41.35	250	C2
07-0848	Cashe Creek #5	44.46.48	114.41.88	950	GR
07-0843	Cashe Creek #1	44.46.15	114.42.35	250	C2
07-0834	Pole	44.45.97	114.39.48	250	C2
07-0833	Liberty #2	44.44.98	114.38.81	500	C2
07-0863	Rock #1	44.45.31	114.40.17	500	C2
07-0864	Rock #2	44.45.16	114.40.25	650	C2
07-0860	Falconberry	44.45.14	114.45.61	650	C2
07-1575	Kelly	44.45.50	114.44.33	330	C2
07-0870	Nelson #1	44.30.87	114.48.92	330	C2
07-0873	Nelson #2	44.30.40	114.48.87	650	C2
07-0873	Nelson #2			1,400	**GR**
07-0885	China #3	44.28.48	114.47.12	1,650	C2
07-1514	East Basin Creek #1	44.19.74	114.47.61	650	C2
	Totals			10,910	C2
				3,950	**GR**
				250	Ri

[a] C2=westslope cutthroat trout
R1 =rainbow trout
GR=Arctic grayling
GN =golden trout

Table 3. Alpine lakes in the White Cloud Peaks stocked with fry, 1993.

Catalog number	Lake name	GPS coordinates		Number stocked	Species[a]
		Latitude	Longitude		
07-1479	Elk	44.13.76	114.44.89	500	C2
07-1470	Garland #3	44.10.35	114.49.01	500	C2
07-1469	Garland #2	44.09.96	114.47.56	500	C2
07-1468	Garland #1	44.09.67	114.46.97	500	C2
07-1467	Swimm	44.08.79	114.40.04	750	C2
07-1463	Hoodoo	44.10.01	114.38.41	250	C2
07-1460	Crater	44.08.57	114.36.57	750	C2
07-1350	Gunsight	44.07.67	114.36.46	500	C2
07-1349	Tincup	44.07.3 5	114.3 6.51	500	GR
07-1464	Ocalkens #1	44.07.62	114.38.33	500	C2
07-1465	Ocalkens #2	44.07.62	114.38.33	750	C2
07-1363	Slide	44.06.78	114.37.20	500	C2
07-1356	Sheep	44.06.83	114.36.75	500	C2
07-1369	Cirque	44.06.33	114.36.96	750	C2
07-1367	Sapphire	44.06.28	114.36.96	750	C2
07-1364	Cove	44.06.15	114.36.43	750	C2
07-1370	Gentian	44.05.82	114.36.72	250	Ri
07-1374	Snow	44.05.80	114.36.85	250	C2
07-1371	Island	44.05.65	114.35.68	500	C2
07-1380	Feldspar	44.05.42	114.35.45	250	GR
07-1377	Dioxide	44.05.75	114.34.90	250	R1
07-1375	Goat	44.06.02	114.34.83	250	C2
07-1347	Little Redfish	44.06.24	114.32.20	250	C2
07-1385	Big Frog	44.04.73	114.32.79	500	C2
07-1420	Castle	44.02.70	114.34.58	500	C2
07-1424	Drift (Shallow)	44.03.76	114.3 6.01	250	C2
07-1405	Headwall	44.04.51	114.35.90	250	C2
07-1407	Lonesome	44.04.57	114.36.34	250	C2
07-1475	Born #2	44.03.50	114.36.71	250	C2
07-1477	Born #3	44.03.39	114.37.05	250	C2
07-1419	Glacier	44.02.90	114.3 6.71	500	C2
07-1430	Hope	44.02.18	114.36.58	250	GR
07-1433	Honey	44.02.22	114.36.30	750	C2
07-1434	Heart	44.02.13	114.36.23	1,000	C2
07-1439	Chamberlain #7	44.01.61	114.35.47	500	C2
07-1440	Castleview	44.01.21	114.35.70	250	C2
07-1569	Martha	44.01.50	114.37.58	500	C2

Table 3. Continued.

Catalog number	Lake name	GPS coordinates Latitude	Longitude	Number stocked	Species[a]
07-1444	Washington #2	44.01.85	114.37.16	750	C2
07-1685	Fourth of July	44.02.58	114.37.86	1,500	C2
07-1672	Six Lakes #1	44.01.69	114.40.67	750	C2
07-1674	Six lakes #3	44.01.49	114.40.37	500	C2
07-1679	Thunder	44.01.28	114.39.60	500	C2
07-1683	Phyllis	44.01.35	114.38.83	1,000	C2
07-1680	Lightening	44.00.88	114.39.81	750	C2
07-1732	Blackrock	44.00.05	114.39.36	500	C2
07-14560	MacRae	43.56.29	114.37.74	1,000	C2

[a] C2=westslope cutthroat trout
R1 =rainbow trout GR=Arctic

grayling

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